Calhoun: The NPS Institutional Archive

DSpace Repository

Theses and Dissertations 1. Thesis and Dissertation Collection, all items

1974

Comparative analysis of capital equipment budgeting systems in health care instutitions.

Talcott, Bruce Edwin.

Monterey, California. Naval Postgraduate School

http://hdl.handle.net/10945/16922

Downloaded from NPS Archive: Calhoun

Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

Dudley Knox Library / Naval Postgraduate School
411 Dyer Road / 1 University Circle
Monterey, California USA 93943

http://www.nps.edu/library

COMPARATIVE ANALYSIS OF CAPITAL EQUIPMENT BUDGETING SYSTEMS IN HEALTH CARE INSTITUTIONS

Bruce Edwin Talcott

UDLEY KNOX LIBRARY
AVAL POSTGRADUATE SCHOOL
ONTEREY, CALIFORNIA 93940

NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

COMPARATIVE ANALYSIS OF CAPITAL EQUIPMENT BUDGETING SYSTEMS IN HEALTH CARE INSTITUTIONS

by

Bruce Edwin Talcott

June 1974

Thesis Advisor: L. Darbyshire

Approved for public release; distribution unlimited.

T162514

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Comparative Analysis of Capital Equipment Budgeting Systems in Health Care Institutions		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis June 1974
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Bruce Edwin Talcott		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		12. REPORT DATE June 1974
		13. NUMBER OF PAGES 126
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) Naval Postgraduate School Monterey, California 93940		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Hospital Equipment Budgeting
Capital Budgeting, Health-Care Industry
Equipment Capital, Hospitals
Budgeting, Hospital Equipment

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The thesis presents a study of capital equipment investment budgeting procedures in the Health Care Industry. It discusses capital equipment investment philosophy in general, and addresses a few of the contemporary problems and corresponding solutions contained in current health-care literature. The thesis also describes the specific capital equipment budgeting systems of three segments of the health-care industry; Navy hospitals,

DD FORM 1 JAN 73 1473 (Page 1)
EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102-014-6601

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entere

Block #20 continued

Veterans Administration hospitals, and non-federal hospitals. Three case studies in capital equipment budgeting - Naval Regional Medical Center, Oakland; Veterans Administration Hospital, Martinez; and Fairmont General Hospital, Alameda County - are presented to illustrate each of the three segments addressed.

Comparative Analysis of Capital Equipment Budgeting Systems in Health Care Institutions

by

Bruce Edwin Talcott
Lieutenant, Medical Service Corps
United States Navy
B.S., George Washington University, 1969

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
June 1974

DUDLEY KNOX LIBRARY
NAVAL POSTGRADUATE
MONTEREY, CALIF

ABSTRACT

This thesis presents a study of capital equipment investment budgeting procedures in the Health Care industry. It discusses capital equipment investment philosophy in general and addresses a few of the contemporary problems and corresponding solutions contained in current health-care literature. The thesis also describes the specific capital equipment budgeting systems of three segments of the health-care industry: Navy hospitals, Veterans Administration hospitals, and non-federal hospitals. Three case studies in capital equipment budgeting - Naval Regional Medical Center, Oakland; Veterans Administration Hospital, Martinez; and Fairmont General Hospital, Alameda County - are presented to illustrate each of the three segments addressed.

TABLE OF CONTENTS

I. GENERAL INTRODUCTION 11
  A. OVERVIEW 11
  B. HOSPITAL CONSTRUCTION PROGRAMS 14
  C. HOSPITAL OPERATING COSTS 16
    1. Labor Costs 16
    2. Consumable Supplies 17
  D. EQUIPMENT COSTS 18
  E. THESIS BACKGROUND 19
    1. Objectives 19
    2. Plan of Study 19
    3. Presentation of Findings 20
II. CAPITAL EQUIPMENT INVESTMENT PHILOSOPHY 21
  A. THE PROBLEMS 21
    1. Investment in Capital Assets 21
    2. Basis for Subsequent Equipment Investment Decisions 24
    3. Problems of Utilization 27
    4. The Technical/Medical Equipment Market... 30
    5. Short-fall Problems in Capital Financing. 33
  B. THE SOLUTIONS 36
    1. Area-wide Planning 36
      a. Mergers 38
      b. Shared Services 38
    2. Financing Mechanisms 39

a. Debt Financing........................ 40

b. Leasing............................... 41

(1) Advantages....................... 41

(2) Disadvantages.................... 43

C. SUMMARY....................................... 44

III. CAPITAL EQUIPMENT BUDGETING IN NAVAL HOSPITALS/REGIONAL MEDICAL CENTERS.......................... 46

A. OVERVIEW...................................... 46

B. SYSTEM FOR CAPITAL EQUIPMENT BUDGETING....... 47

1. Equipment Categories....................... 48

a. Investment Equipment.................. 48

b. New Construction Equipment........... 48

c. Research and Development Equipment... 48

d. Special Interest Items............... 48

e. Non-investment Equipment............. 49

C. EQUIPMENT BUDGETING AT THE HOSPITAL/REGIONAL MEDICAL CENTER................................ 49

1. Development of Equipment Requirements.... 50

2. Verification and Consolidation........... 50

3. Analysis and Review...................... 51

4. Submission of Requirements............... 51

5. Continuous Budget Activity............... 52

a. Updated Priority Listing............. 52

b. Prior Year Requisitions.............. 52

D. CAPITAL EQUIPMENT BUDGETING AT THE BUREAU LEVEL... 53

1. Technical Review......................... 53

2. OPN Funding Administration and Distribution............................... 54

            a. Percentage of Total Owned Assets..... 55
            b. Urgency of Need........................ 55
            c. Special Interest Programs........... 55

    E. ANALYSIS OF THE NAVY SYSTEM..................... 56

    F. CASE STUDY IN CAPITAL EQUIPMENT BUDGETING AT THE NAVAL REGIONAL MEDICAL CENTER, OAKLAND, CALIFORNIA.......................... 57

        1. Background and Organization.............. 57
        2. Workload.................................. 57
            a. Inpatients.......................... 57
            b. Outpatients......................... 58
        3. Operating Costs.......................... 58
        4. NRMC Investment in Capital Equipment..... 58
        5. Capital Equipment Budgeting Process...... 58
            a. Organization of the Budgeting Process................................. 58
            b. NRMC Budgeting Cycle................. 59
            c. Relationship Between Equipment Needs and Funding.......................... 62
            d. Analysis of NRMC Oakland's System.... 62

    G. SUMMARY.. 64

IV. CAPITAL EQUIPMENT BUDGETING IN VETERANS ADMINISTRATION HOSPITALS.. 66

    A. OVERVIEW... 66
    B. SYSTEM FOR CAPITAL EQUIPMENT BUDGETING....... 66
        1. Capital Equipment Categories............. 67
        2. VA Equipment Standards................... 68
        3. Capital Equipment Budget................. 68
            a. Equipment Replacement Program........ 68

- b. Additional Equipment in Support of Special Projects.................... 70
- c. Additional Equipment Requirements Not Part of Special Projects......... 71
- 4. Analysis of the VA System............... 71
- C. CASE STUDY IN CAPITAL EQUIPMENT BUDGETING AT THE MARTINEZ VETERANS ADMINISTRATION HOSPITAL.............................. 73
  - 1. Background and Organization............. 73
  - 2. Workload........................... 73
    - a. Inpatients........................ 73
    - b. Outpatients....................... 73
  - 3. Annual Operating Costs................... 73
  - 4. Martinez' Investment in Capital Equipment................................ 74
  - 5. Capital Equipment Budgeting System....... 74
    - a. Organization of the Budgeting Process................................ 75
    - b. Martinez' Budgeting Cycle........... 76
    - c. Relationship Between Equipment Needs and Funding......................... 78
    - d. Analysis of Martinez' Equipment Budgeting Process.................... 79
- D. SUMMARY................................. 80

V. CAPITAL EQUIPMENT BUDGETING IN NON-FEDERAL HOSPITALS.................................. 82
- A. OVERVIEW................................ 82
  - 1. Organization............................. 82
    - a. Long-term Hospitals.................. 83
    - b. Short-term Hospitals................. 83
  - 2. Workload and Cost Data................... 85

        a. Patient Care 85
        b. Operating Costs 85
        c. Investment in Fixed Assets 85
  B. CAPITAL EQUIPMENT BUDGETING 85
     1. Degree of Urgency 86
     2. Analysis Factors 87
        a. Cost Benefit Analysis 88
        b. Discounting Techniques 89
        c. Nondescript Analysis Techniques 90
  C. CASE STUDY IN CAPITAL EQUIPMENT BUDGETING AT THE FAIRMONT GENERAL HOSPITAL ... 91
     1. Background and Organization 91
     2. Workload 91
        a. Inpatient Care 92
        b. Outpatient Care 92
     3. Annual Operating Costs 92
     4. Investment in Equipment Assets 92
     5. Capital Equipment Budgeting System 92
        a. Organization 92
        b. Fairmont's Budgeting Cycle 94
        c. Relationship Between Equipment Needs and Funding ... 96
        d. Analysis of Fairmont's System 96
  D. SUMMARY 98
VI. CONCLUSIONS 100
APPENDIX A: EQUIPMENT JUSTIFICATION 110
APPENDIX B: NRMC OAKLAND ORGANIZATION CHART 112
APPENDIX C: NRMC OAKLAND NOTICE 4235, 8 AUGUST 1973 ... 113

APPENDIX D: NRMC PROCUREMENT REQUEST.................. 115

APPENDIX E: VA NON-RECURRING EQUIPMENT REQUIREMENTS... 116

APPENDIX F: VA EQUIPMENT REQUIREMENTS REQUEST......... 117

APPENDIX G: DISTRIBUTION OF PLANNED FY 1973 BUDGET DOLLARS.................................... 118

APPENDIX H: BUDGET PLAN FY 1973....................... 119

APPENDIX I: PRIORITY DEFINITIONS...................... 120

APPENDIX J: NUMBER AND RELATIVE PROPORTIONS OF NON-FEDERAL HOSPITALS IN THE UNITED STATES.... 121

APPENDIX K: CAPITAL EQUIPMENT REQUEST................. 122

LIST OF REFERENCES.................................... 123

INITIAL DISTRIBUTION LIST............................. 126

I. GENERAL INTRODUCTION

A. OVERVIEW

The health-care industry in America continues to receive major criticism from three fronts - the consumer, the local community, and the government. The primary complaint voiced by each interest group is the apparent excessive cost of health-care, both in the absolute sense and relative to other "costs of living". Paradoxically, from the same interest groups, comes a plea for better health-care services, more physicians, improved comfort and habitability for patients, and the absolute ultimate in technical medical equipment. Hospital Administrators, caught in the middle of the controversy, must respond to the demands of the interest groups and at the same time manage the complex business aspects of their respective hospitals. One interest group, represented by boards of trustees, community leaders, hospitalization insurance executives, and Medicare/Medicaid administrators, demand immediate accountability for and action against the rising costs of medical care. Another group, represented by the professional and lay hospital staffs, demand higher wages, better working conditions, and the latest in facility and equipment technology. The final and perhaps most insistent interest group, the patients themselves through direct pressure on community health-care agencies, demand what they perceive to be the best possible health-care services available at any cost.

It is a well documented fact that the cost of medical care for Americans has risen significantly in both absolute and relative terms during the twentieth century. Over the past two decades alone, the cost of health-care has risen 145 percent, compared to a consumer price index rise of 72 percent. [Ref. 1] The most dramatic component of the health-care increase has been the rising cost-per-patient day in community hospitals: from a $16 per day average in 1950 to $103 in 1972, a rise of more than 500 percent. In relation to total U. S. spending, medical care expenditures in 1955 accounted for 4.6 percent, in 1972 the total bill accounted for 7.6 percent, and one author predicts that if the present trend continues, the cost of medical care will approach 9.8 percent by 1980. [Ref. 2] In absolute terms, the total bill for health-care services in the United States rose from a little above ten billion in 1950 to just under eighty billion in 1972. [Ref. 1] One very important aspect of the health-care cost dilemma is the growing importance of health insurance. Today, more than 95 percent of all Americans are covered by some form of health and medical insurance. [Ref. 1] The third-party payers, including Medicare/Medicaid, have to some extent lessened the impact of rising health-care costs to their beneficiaries by absorbing much of the increase in out-of-pocket costs. While the total cost of hospital care rose from $16 to $103 per day, the average out-of-pocket cost in current dollars to the patients has risen from $10 to $19 per day. The remaining

$84 per day in 1972 was reimbursed by the health insurance companies and health agencies. [Ref. 1] It should be noted, however, that there are many inequities with health insurance. In general, insurance premiums are expensive and many plans are quite shallow in terms of benefits. Low-paid workers, individuals who are frequently unemployed, and those who are self-employed or work for small firms are likely to have very limited health-care coverage. On the other hand, skilled workers, persons employed by large firms, and governmental employees are generally well-covered by broad insurance plans, partially subsidized by their employers.

The distribution of the total expenditures on health, not counting insurance premiums, does not follow the smooth pattern of other consumer goods such as food or housing. Some families spend almost nothing for medical care, the majority spend relatively little, and a few families are obliged to spend a great deal. A study of health-care spending by Federal Government employees, conducted in 1969, showed that a little over fifty percent of the families surveyed spent less than $260 on health-care related items, ten percent of the families spent over $1,500, and five percent spent over $2,600. [Ref. 1]

The causes leading to the high cost of health-care in America are complex, yet many increases are intertwined with the general increases in price levels observed elsewhere throughout the economy. Direct hospital costs, a part of

which is the main concern of this thesis, account for approximately forty percent of the total health-care services expenditures in the United States. For the purpose of general introductory comments, the hospital costs will be classified into three categories: hospital construction costs, hospital operating costs, and hospital equipment costs.

B. HOSPITAL CONSTRUCTION PROGRAMS

The costs associated with the designing, building, and equipping of a new hospital are tied directly to the increases in price levels observed throughout the building construction industry. Construction materials and labor costs increase almost daily. The costs associated with new hospital building programs presently increase at such a rate that the planning estimates developed in the early stages of a three to five year planning program, are irrelevant by the time contracts are negotiated. This phenomen places particular hardships on the federally sponsored hospital building programs because new hospital construction projects, constrained by Federal budgeting procedures and hampered by lengthly Congressional involvement, do not become reality for at least five years in the future. By the time construction contracts are negotiated, the five-year old planning figures appropriated by Congress are severely understated. Given the maximum five percent cost inflation factor, the Federal sponsored hospital planners are faced with essentially two recourses: to purchase less hospital facilities

than were originally planned, or to go back through the complicated funding channels for more money.

The largest body of information relative to hospital construction costs in the U.S. is contained within the records of the Hill-Burton Program "Hospital Survey and Construction Act." The Federal Government, under the provisions of Public Law 79-725, Title VI of the Public Health Service Act provides financial assistance to individual state health care construction programs in the form of partial funding grants. [Ref. 3] By the year 1969, after twenty-two years of operation, the Hill-Burton program had assisted state health care programs with Federal funds totaling 3.47 billion dollars in construction of 5,592 voluntary non-profit and community owned hospitals, which provide a total of 329,011 beds. Three examples of recent hospital construction projects, funded with assistance of the Hill-Burton program, are cited below: [Ref. 4]

1. General Hospital, Glendale, California - 150 beds. Eight floors, 145,015 sq. ft. floor area, 967 sq. ft. per bed. Bldg. and fixed equipment cost - $6,760,580. Total project cost - $7,889,914 for an average cost per sq. ft. of $54.41 and per patient bed of $52,599.

2. General Hospital, Lansing, Michigan - 256 beds. Seven floors, 185,500 sq. ft. floor area, 725 sq. ft. per bed. Bldg. and fixed equipment cost - $9,164,322. Total project cost - $9,962,815 for an average cost per sq. ft. of $53.71 and per patient bed of $38,917.

3. General Hospital, Greenville, South Carolina - 308 beds. Seven floors, 322,534 sq. ft. floor area, 1,047 sq. ft. per bed. Bldg. and fixed equipment cost - $13,744,082. Total project cost - $17,607,458 for an average cost per sq. ft. of $54.59 and per patient bed of $57,163

C. HOSPITAL OPERATING COSTS

Hospital operating costs, including labor, plant operations, and consumable supplies are also tied to the general price level of the economy, and account for a significant portion of the total bill for health-care in America. One frequently quoted ratio in the health-care industry is the relation of annual operating costs to construction costs. In the not too distant past, construction costs were typically equal to four years operating costs. Today, it is not uncommon for hospital operating costs to exceed the construction costs in less than two years. [Ref. 5] The "1973 Annual Guide" issue of Hospitals, published by the American Hospital Association, shows the gap between total assets and annual operating costs to be even closer than two-to-one. During 1973, non-federal hospitals with assets totaling 39.9 billion dollars spent 29.5 billion dollars in operating expenditures.

1. Labor Costs

To say that hospitals are labor intensive would be an understatement. In 1962, hospitals employed an average of 280 workers for every 100 patients. By 1971, the ratio had risen to 308 employees to 100 patients, and one New York

City public hospital recently requested an employee/patient ratio of five-to-one. [Ref. 2] The cause for the increase in employee-to-patient ratio is generally attributed to the improvement in working conditions of hospital employees. The sixty to eighty hour work weeks for both professional and non-professional hospital workers are no longer tolerated. Almost every group of hospital employees, from the nursing staff to the housekeeping force, are represented by one or more labor unions. Collective bargaining on such issues as pay, fringe benefits, and working hours, is now an accepted fact in the health-care industry.

A second, but less publicized cause for the increase in employee-to-patient ratio is the statistical result of a decline in a hospital's patient bed utilization rate. The utilization rate, based upon the average census as a percentage of total available beds, has shown a slight but consistent decline for the health-care industry as a whole during the past several years. In-as-much as the number of hospital employee's corresponds to the number of patient beds provided, the decline in utilization results in an increase in the employee-to-patient ratio.

2. Consumable Supplies

The average hospital consumes literally tons of medical and supportive care supplies each day. Aside from the food service and habitability items, thousands of disposable surgical implements and pharmaceutical preparations are used and disposed of in the course of treatment for a single

patient. The average hospital pharmacy in an effort to cover potential pharmaceutical item requests, must consider some 22,000 trade-name preparations available on the ethical pharmaceutical market. [Ref. 6] In the field of minor medical equipment and supplies, there is no reliable estimate as to the number of individual items available on the market but it certainly exceeds 20,000, ranging from cotton balls and tongue depressors to disposable syringes and bedpans. Each additional service or specialty provided by the hospital increases the burden of expense to the patient. The laboratory, the x-ray department, and the hospital pharmacy to name three services provided by most hospitals; and the intensive care unit, the kidney dialysis unit, and nuclear medicine service provided by specialized treatment centers each contribute to the ever-increasing operating costs of health-care, and hopefully to the improved reliability of diagnosis and treatment of patients.

D. EQUIPMENT COSTS

Equipment capital in hospitals, the prime concern of this thesis, presents a confusing array of technical medical and administrative items, linked in part to the number of patient beds, in part to the kinds of services provided, and in part to the hospital's demand for and retention of scarce physicians and specialists. Regardless of how the equipment program requirements are generated, approved, and financed, the average hospital's investment in equipment is substantial and contributes directly to the cost of health-care to the

patient by means of the daily hospital charge and the special fees, either directly or through insurance premium increases.

E. THESIS BACKGROUND

1. Objective

The primary objective of this thesis is to study, describe, and compare the respective procedures utilized by governmental and private health-care institutions toward identifying equipment needs at the functional operating level within the hospital, analyzing the equipment budget program items at the top management levels, and providing ultimate funding for the approved equipment programs.

2. Plan of Study

The plan of study and research of capital equipment budgeting in the health-care industry was conducted in three phases as described below:

a. Thorough search of current literature to explore specific issues concerning the health-care industry in general, and capital equipment budgeting in particular.

b. Correspondence with professional and administrative organizations within the health-care industry - The American Hospital Association; U. S. Public Health Service of the Department of Health, Education, and Welfare; Veterans Administration, and the Navy Bureau of Medicine and Surgery.

c. On-site survey of methods and procedures, and discussions with management personnel involved with capital equipment budgeting at three health-care institutions: the Naval Regional Medical Center, Oakland, Calif.; Veterans

Administration Hospital, Martinez, Calif.; and Fairmont General Hospital, Alameda County, California.

3. Presentation of Findings

The findings will be presented in the following sequence:

a. Chapter II presents an overview of capital equipment budgeting philosophy in the health-care industry, drawn from the current literature, discusses a few specific problems, and describes various documented solutions to the problems.

b. Chapter III discusses capital equipment budgeting in Navy hospitals, both at the individual hospital level and at the Bureau of Medicine and Surgery. It concludes with a case study of the capital equipment budgeting procedures utilized by the Naval Regional Medical Center in Oakland, California.

c. Chapter IV discusses capital equipment budgeting within the Veterans Administration health-care system, and presents a case study of the procedures at the Veterans Hospital in Martinez, California.

d. Chapter V addresses capital equipment budgeting in the non-federal portion of the health-care industry, and presents a case study of the procedures utilized at Fairmont General Hospital, Alameda County California.

e. Chapter VI, presents the conclusions and recommendations of the author.

II. CAPITAL EQUIPMENT INVESTMENT PHILOSOPHY

The current literature, both in and out of the health-care industry, addresses several current problems with regard to the capital equipment asset structure of individual and groups of hospitals which serve the patient care needs of communities across the country. This chapter will explore some of the basic premises of the capital equipment investment philosophy in the health-care industry, and will describe some of the more controversial problems in terms of the initial capital equipment investment and the propensity of hospitals to take on new investments. It will also address the interaction of the hospitals with the medical equipment manufacturing industry, and the problems inherent in obtaining financial resources in support of the approved equipment programs. The final section will describe some of the means by which the health-care industry and the community work toward the solutions.

A. THE PROBLEMS

1. Investment in Capital Assets

In most manufacturing industries, there are some faily well documented and accepted ratios which relate a desired output of manufactured product to the number of specific machines necessary for production. If, to cite a contrived example, the projected output of widgets per hour is determined to be 200, and the capacity of a widget

stamping machine is known to be 50 widgets per hour - four machines will be needed to produce the required output.[1] No such firm and accepted documentation of ratios of medical equipment to patients exists in the health-care industry except for a rough starting approximation for the planning of a new facility. The U. S. Department of Health, Education, and Welfare publishes a Hospital and Nursing Home Equipment Planning Guide to assist in the planning of new facilities; but the estimates, provided only at the 50, 100, and 200 bed levels, are very broad in content and are concerned primarily with furnishings and basic major equipment items. [Ref. 7] Another publication, Cost Guidelines for Hospital Equipment Planning, casts the equipment requirements for hospitals in terms of average dollars invested per equipment category. Published by the Industrial Appraisal Company of Pittsburgh, Pa. in cooperation with the U.S. Public Health Service in 1968, the cost guidelines are established as statistical averages gleaned from the hospital accounting records and accounting appraisals from hospitals located throughout the country. [Ref. 8] The cost guidelines, again provided at the 50, 100, and 200 bed levels, express equipment capital investments in terms of high and low dollar value averages. As an example of the

---

[1] This example is over-simplified and pertains only to a short-run situation. In the long-run, other economic factors influencing efficiency and capital-labor mix would over-ride the linear representation.

information contained in the guidelines, the average investment in fixed diagnostic X-ray equipment for 50 bed hospitals is $25,399 high average, and $14,394 low average; in movable diagnostic X-ray equipment the average investment is $39,331 high average, and $20,158 for low average. [Ref. 8] It should be pointed out that such dollar value averages are tentative at best. Due caution should be exercised in their use to account for geographical differences and price level adjustments. In one study of equipment capital in ten New York City hospitals conducted in 1969, an attempt was made to identify some fairly predictable basis for comparing the equipment capital assets between hospitals. [Ref. 9] The equipment assets of the ten hospitals, costed at net book value, were classified as either fixed or movable and were end-use designated by major department into four categories: Medical, Medical supportive, Administrative, and Administrative supportive. Comparative analyses within and among the ten hospitals were conducted in various combinations including, "Net book value by major department", "percentage distribution by major department", and "Net book value per bed by major department." The results of the analysis showed considerable variability between hospitals, primarily in the medical and medical-supportive categories. Although each of the ten hospitals relative investments in equipment were in similiar proportions in each of the four categories, there was considerable difference between hospitals. The net book value of total equipment per bed ranged from $6,087

per bed in a large teaching hospital to $1,510 in a community hospital. The mean was $3,315 per bed in the two medical categories and $959 per bed in the two administrative categories. One interesting phenomenon cited in the study was the hospital management's use of equipment to entice and retain its medical staff, particularly the specialists, in the face of stiff competition. The latest in up-to-date medical equipment appears to be an essential component of the hospital facility to enhance the productivity and earning power of its practicing staff and house physicians. Although the study did not specifically address the differences in patient case mix between the large teaching hospital and the community hospital, it should be noted that such differences exist and that these differences provide considerable impact on the capital equipment asset structure. Teaching hospitals place considerable emphasis on providing complicated medical/surgical cases for their intern and residency programs. As a consequence, teaching hospitals frequently procure exotic items of medical equipment which would not be considered in the community hospitals.

2. Basis for Subsequent Equipment Investment Decisions

The equipment capital assets held by individual hospitals, as pointed out in the preceeding section, do not seem to follow any particular set pattern, beyond the new construction program, which can be satisfactorily identified and communicated from one hospital to another. It would appear that each hospital, within its internal management

mechanisms, decides what patient services it will provide to the community, establishes the necessary internal organization to provide these services, developes equipment requirements (assisted by an army of over-enthusiastic medical equipment manufacturing sales representatives), arranges for the necessary qualified and technically trained personnel, and proceeds to the supportive funding arrangements. After funding is received, the equipment is purchased and installed, and additional technicians are employed; the total capital investment for the new service, amortized over a predetermined number of years, is divided by the number of patient beds in the hospital in some fashion roughly equivalent to the calculation in Exhibit (II-1) below:

Exhibit (II-1)

$$\frac{\text{Total Capital Investment}}{\text{X no. yrs. x 365 days}} \quad — \quad \text{No. of beds} = \$\ \text{XX.XX}$$

$$\frac{\text{Annual Operating Costs}}{\text{365 days}} \quad — \quad \text{No. of beds} = \$\ \text{XX.XX}$$

Present cost per patient day = $ XX.XX

New cost per patient day $XXX.XX

The current health-care industry literature is replete with just such examples. In each case, the article describes the benefits of the new service to the patient and justifies the additional investment in terms of technological advances in the industry and occasionally on the basis of cost-saving in some related area of the hospital. One article in the November 1973 issue of Hospitals describes a new automatic/

electronic monitoring system for cardiac patients, recently installed in the Mount Zion Hospital in San Francisco. [Ref. 10] The new system reportedly monitors cardiac activity by means of a computer assisted electrocardiograph device connected to as many as twenty patients simultaneously. The new system differs from the conventional cardiac monitoring systems by way of the automatic feature - electrocardiogram patterns visually displayed on a CRT device are also continually monitored by the console which alerts attending personnel of any cardiac change outside the normal limits. The new system, containing other technological advances, is installed in units of five beds or more at a cost of $2,000 per bed.

Another article, also in Hospitals, addresses the aspects of planning for a nuclear medicine service in a hospital. [Ref. 11] The article lays out the equipment requirements on three progressive user levels from the small hospital to the university medical center, describes the range of procedures performed by each level, and documents the investment costs which span from $20,000 to $240,000. One interesting facet to this article is the author's treatment of the financial management aspects of capital budgeting. The notion of return-on-investment is explicitly stated, complete with a three year payback period for hospitals using payback criteria, a three to five year project life for hospitals using a discounted cash flow method, and some estimate of trade-in value at the end of the investments economic life.

The explicit purpose for adding all of these new and expensive services in hospitals, of course, is to improve the reliability in diagnosing and treating patients diseases, and in so doing, reduce the probability of mortality. Some critics, both in and out of the health-care industry, point to a potential suboptimizing phenomenon - the implicit purpose of taking on added capital investment in new services and equipment for the intrinsic value of the things themselves. There exists the notion that physicians and specialists on hospital professional staffs frequently lose sight of the practical aspects of the hospital organization as a self-perpetuating, self-sustaining commercial business in American economy. They, the physicians and specialists, become overly enamoured by the dazzling array of medical/ electronics equipment which virtually feeds on its own obsolescence, and insist on the absolute latest edition of this or that piece of equipment in the furtherance of saving the lives of their patients. In the face of such insistance and almost divine justification, it becomes increasingly difficult for the parochial hospital administrators to refuse their professional staff's demands for added capital investment.

3. Problems of Utilization

Two frequently referred to "buzz-words" in the health-care industry are "overutilization" and "underutilization." The former, in a medical equipment context, refers to a situation wherein a provider of medical services tends to

overutilize certain medical technology in diagnosing and treating relatively straightforward conditions. The latter word refers to health-care institutions which have unwittingly expanded their facilities beyond the needs of their consumers, and as a consequence are saddled with costly excess capacity.

Dr. C. L. Mengis, former Assistant Chief of Medicine at the U. S. Army Hospital Fort Jay N.Y. and presently in private practice in internal medicine, condemns the practice of "showmanship" at hospitals in his article "Age of Overutilization." [Ref. 12] Dr. Mengis, disturbed by the prevailing reliance of the "shiny, glassy, instrumentalized world" of today's modern hospital, takes issue against three interrelated institutional groups who are responsible for the "overutilization." First, the physicians and specialists who introduce the so called "dog and pony" shows and ultimately come to depend upon them. Second, the institutional and governmental system which promotes and finances the expensive "productions." Finally, the laymen administrators "who judge them (the productions) for their superficial impressiveness and the amount of money and publicity they will bring into the institution."

The author of this thesis does not fully subscribe to the severe criticism levelled at the hospitals, just described, although there is undoubtedly an element of truth in the charges. It is perhaps a simple matter for a relatively healthy impartial observer, or even a practicing physician

to condemn his community hospital for investing a considerable sum of capital in a kidney dialysis program which has questionable potential with respect to return-on-investment. It is another matter entirely for the unfortunate but equally deserving patient with two diseased kidneys. It is within this context, i.e. justifying investments in additional medical technology for the express purpose of "saving lives," that capital equipment investment decisions in the health-care industry become uniquely complicated. How one goes about quantifying in precise dollar terms, the potential reduction in a hospital's mortality rate as the result of some specific investment in life-saving medical technology, is not now, nor probably ever will be, clearly defined.

The most unfortunate problem in the health-care industry concerning the utilization of advanced medical/technological equipment and facilities does not manifest itself so much at the individual hospital level, as it does between two or more competing hospitals serving the same patient population in a single community. The individual hospital serving an entire community is more likely to provide only those specialty services which it can afford and justify on the basis of documented need. As an example, the Walton County Hospital serving the total patient care needs of De Funiak Springs, Fla. is likely to be heavily invested in capital assets devoted toward geriatric services for the retired, senior citizen population. In larger communities where there are two or more hospitals serving the same

patient population, there exists the tendency for the hospitals to try to out-do each other - not so much to compete with each other in attracting patients directly, but to compete for the services of the physicians and specialists who in turn bring in the patients. The unfortunate result of this intense competition between hospitals is a costly overlapping and duplication of equipment and facilities. One observer characterized the health care delivery system of the mid 1960's as "a disorganized, competitive, group of institutions, agencies, and individual deliverers of care experiencing already high and ever-increasing utilization levels." [Ref. 13] He points to the significant duplication of services and increasingly high costs for personnel, equipment, and plant as the major contributors to the escalating and disproportionate costs of health-care to Americans.

4. The Technical/Medical Equipment Market

The medical device and equipment industry has grown at an astounding rate during the past two decades. New and advanced technology in diagnostic and therapeutic equipment and devices literally bombard the health-care market every day. Countless millions of dollars in research and development effort each year are devoted directly to the design, production, and marketing of new products which frequently become obsolete in three to five years down the road. In addition to the direct medical R & D effort, the health-care industry benefits from technological spin-offs from other industrial developments such as aero-space technology and

Solid state electronics. Much of the new technology is so highly sophisticated that conventional techniques for controlled testing and evaluation are virtually impossible. Regulatory controls imposed by government legislation in other health care related industries, such as the pharmaceutical industry, have only recently begun to apply to the production and sale of equipment and devices, and there has been a growing concern for the safety and effectiveness of the various devices with respect to the patient and the technician. Particular concern has been voiced with regard to the implantable type devices such as pacemakers, mechanical valves, and intrauterine contraceptive devices. One author estimated that in 1974, 100,000 arterial grafts, 45,000 heart valves, and 200,000 cerebrospinal-fluid shunts would be inserted; and 50,000 new pacemakers would be installed. [Ref. 6] He further estimated that by 1975, sales for such devices would exceed $640 million dollars and by 1980, $890 million. Another article puts the number of devices produced annually at 100,000 separately identifiable items, produced by 3,000 manufacturers. [Ref. 14]

Legislation, still pending in Congress as of June 1973, would regulate the safety and efficiency of all medical devices on the market through the mechanisms employed by the Federal Food and Drug Administration and the U.S. Department of Health, Education, and Welfare for controlling pharmaceuticals. [Ref. 14] The problem with hospital diagnostic and therapeutic equipment remains, however, as the market for

new and existing items increases. Surgical Business, a hospital equipment industry journal, in 1972 compared the grand total of shipments of medical care related items for 1963 and 1967 with a projected outlook for 1972. [Ref. 15] The industry figures for 1963 were $1,000,500,000, for 1967 were $1,502,900,000, and projected for 1972 were $2,171,600,000.

Every hospital in America, private or governmental, has a closet full of expensive but useless equipment, purchased on the basis of justifications submitted by well-intentioned but perhaps misled medical staff members who became overly enamoured by the glowing claims of the manufacturers. Consider the fad of the mid 1960's for installing hyperbaric chambers in hospital operating rooms. Costing near $100,000 per installation, their value to the surgical patient is now considered marginal. [Ref. 6] Perhaps the most significant implication for administrators of health-care facilities lies in the relationship between the physicians and the medical equipment manufacturers. The annoying questions which recur throughout any discussion of technical medical equipment and devices are "how can one physician or specialist keep abreast with the almost daily technological advances in the medical equipment market?", and "what assurance can he give that this or that item is the best investment for his hospital?" The answers are not simple. The physician must rely, for the most part, on what he reads in his technical journals, on the advise of his professional peers, and ultimately on the sales pitches of the manufacturers representatives.

Exactly how much credibility can be placed on each of these sources of information is a matter for conjecture. One needs only to thumb through the latest issue of Hospitals or the Journal of the American Medical Association to discover what is perhaps the most extensive advertising campaign in any American industry. Pharmaceutical and medical equipment manufacturers spend countless millions of dollars each year in advertisement and product promotion. Sales representatives, constrained by little more than the desire to be able to come back and sell again, virtually guarantee their respective equipment lines to be "just what the doctor ordered." The hospitals' equipment closets, however, bear mute evidence to the fact that such glowing guarantees occasionally go awry.

Even if the uncertainties relative to manufacturers claims of safety and effectiveness of medical equipment were minimized, the considerable variability in the economic life of many items remains a significant problem. Many individual items, such as those utilized in a nuclear medicine unit or a clinical laboratory, must be amortized over a very short period of time due to early obsolescence. The short and unpredictable economic life span of medical/technical equipment severely complicates the program decision analysis and the resulting financial funding arrangements.

5. Short-fall Problems in Capital Financing

There exists considerable concern in the health-care industry, for the expanding unmet capital funding needs of

health-care institutions. The present trends in the growth of hospital services and facilities are beginning to outdistance the corresponding availability of capital funding. Studies conducted by the U. S. Department of Health, Education, and Welfare project an industry need for about twenty billion dollars worth of new capital during the next five years. [Ref. 16] Of the $20 billion needed, $12 billion will be spent on general hospitals, $8.5 billion on modernization of existing facilities, and $3.5 billion for additional capacity. As traditional sources of funds for hospitals decline, new conventional means for obtaining capital must be developed and utilized. Historically, most hospitals obtained their financial capital from philanthropic and governmental sources. As little as ten years ago, the typical community hospital received close to thirty percent of the funds needed for facility expansion from philanthropy, about thirty-five percent from governmental sources, and the remaining funds from earned reserves. [Ref. 16] The percentage shares are considerably less today, even though in absolute terms, philanthropic and governmental supplied funds are increasing. The obvious dilemma faced by hospitals, again, can be traced to rapid technological change, the high degree of obsolescence, and the general increase in the demand for health-care at the community level.

Of increasing importance as a source of capital, the third-party payers, i.e. Medicare/Medicaid and health insurance programs, reimburse the hospitals for treatment

rendered to their members. Some critics, however, point out that present third-party reimbursement trends actually worsen the capital crunch. [Ref. 17] As an example, current Medicare/Medicaid legislation allows reimbursement only to the extent of direct operating costs. Capital investments in plant and equipment are reimbursable only on the basis of the current portion of authorized depreciation. It becomes exceedingly difficult for a hospital to repay a twenty year mortgage payment on the basis of forty year depreciation reimbursement.

Governmental sponsored and financed hospitals face similiar capital rationing problems. Capital budgeting processes are lengthly and are deeply involved with political and bureaucratic systems. Of particular concern to governmental hospital administrators, is the fact that the funding of capital equipment programs frequently bears little relation to the services provided or the population served. The governmental hospitals, particularly the military and veterans hospitals, do not receive a specific number of dollars per patient as do the non-federal hospitals. Consequently, an increase in patient workload which would be a windfall to the non-federal hospital, becomes an additional burden to the federal hospital.

Given the cash inflows from the declining but still significant philanthropic sources, the governmental grants, the third-party payers, and the direct payers for patient care; and considering the short-falls from bad debt write-offs,

and the lag between reimbursement and actual outflows for capital assets - the best a hospital can expect to do is to stay even. Add in the defensive investment resulting from technological improvements along with the demand for increased patient care capacity - and the considerable capital crunch becomes alarmingly apparent. Capital rationing, a new complication for hospital administrators, both governmental and private, is now becoming an important parameter in capital equipment budgeting programs.

B. THE SOLUTIONS

The health-care industry, in the face of increasingly insistent criticism from within and outside, is devoting considerable effort toward providing acceptable solutions to the aforementioned problems as well as a host of others not addressed in this thesis. Several of the contemporary approaches toward solving the various problems will be discussed briefly under the sub-headings, Area-wide planning, and Financing mechanisms.

1. Area-wide Planning

Incredible as it may seem, long-range community oriented planning for delivery of health-care services to consumers is a relatively recent innovation in the health-care industry. The planning oriented profile of health-care did not emerge until the early and mid 1960's. [Ref. 13] Since that time, however, intensive effort has been devoted toward "planning for more effective delivery of health care in the various regions of the country and to developing

systems that would be more universal in their availability and that would provide accessible care where needed without increasing costs at a rate disproportionate to the availability and the expansion of the services." [Ref. 13]

The health-care planning agencies at the national, regional state, and local levels, are now formalized and in some instances are financially assisted by Federal grants. Title 18 and 19 of Public Law 89-79 Social Security Act, Public Law 89-237 Planning and Operations Grants, and Public Law 89-749 Comprehensive Health Planning Act, provide the stimulus within which 170 separate planning agencies encompass over 80 percent of the population in America. [Ref. 13]

Two types of planning agencies are differentiated in Public Law 89-749 - "A" agencies which are state-wide, and "B" agencies which are regional. The "A" and "B" agencies are each responsible for development of specific comprehensive plans, initially on a regional basis and then on a state-wide basis. In general, the "A" agencies are a little better organized, and are able to provide more to the individual hospitals in the way of capital equipment budgeting expertise, than are the "B" agencies.

One small, but very important provision of another health-care related statute, the Social Security Amendments of 1972 (Public Law 92-603) ties Medicare reimbursements to state and local health facility plans. The law authorizes the reduction of Medicare reimbursements to institutions

for interest, depreciation, and return on equity capital (where applicable) related to capital expenditures in excess of $100,000 that are determined to be inconsistent with state and local health facility plans. [Ref. 18]

Two recent outgrowths of the comprehensive health-care planning philosophy, which are of significant importance in terms of capital equipment budgeting are the hospital merger and shared service concepts.

a. Mergers

Although primarily academic at this time, there is considerable discussion in the health-care industry over a variety of merger strategies designed to combine the efforts and capital assets of two or more community hospitals serving common patient populations. The industry is in general agreement over the need to centralize health-care delivery systems within the community, but there exists considerable reluctance on the part of administrators, medical staffs, and governing boards to destroy the individual and autonomous character of their respective institutions. [Ref. 19]

b. Shared Services

The sharing of individual hospital services on a collective, community-wide basis appears to be gaining wider support than the outright merger. Some form of sharing occurs in over half of the nations hospitals with a considerable amount of satisfaction being voiced. The resultant benefits in terms of dollars saved in both capital

assets and operating costs lends considerable support to the service sharing concept. One study of the Minneapolis area projected capital cost savings of four to six million dollars and annual operating expense reductions of four million at two large Minneapolis metropolitan hospitals if they were to share thirty services. [Ref. 19]

A parallel planning and regionalization concept exists in the health care delivery system of the U. S. Navy. Virtually all Naval Hospitals in the United States have broadened their area of responsibility to encompass the peripheral medical care activities within their respective regions. The former Naval Hospital at Oakland, Calif., as an example, is now the Naval Regional Medical Center and the Commanding Officer of NRMC presently exercises both management and technical control over the activities of ten dispensaries located throughout the San Francisco Bay area as well as the Naval Hospital in Oakland.

2. Financing Mechanisms

Given the present and projected future capital financing crunch, and the costs vs. reimbursement short fall - hospitals are gradually looking toward other means for financing their additional investments in capital plant and equipment assets. Two sources of investment capital funding, beyond the traditional philanthropic and governmental sources discussed earlier, which are gaining increased importance in the health care industry are debt financing and leasing arrangements.

a. Debt Financing

The increased importance of debt financing to hospitals was made a matter of record at the proceedings of an institute conducted by the American Hospital Association in Chicago in 1961. The results of the proceedings, published in a report titled Guides to Capital Financing of Hospitals, devoted a chapter to "Mortgages and Debentures" which described in detail the use and limitations of debt financing. [Ref. 20] The guide lists the sources of debt capital in order of their importance as the public bond or debenture market, insurance companies, and bank loans; and places the maximum loan limit for hospitals at fifty percent of the "reasonable or sound depreciated value of the hospital after investing the proceeds of the loan".

The interest charges on hospital borrowing seem to parallel those noted in other low risk industries. In general, hospitals appear to be relatively stable loan risks primarily because of their ability to obtain reimbursement for services provided.

Tax-exempt financing, the borrowing advantage recognized by municipal hospitals, is now becoming available to the voluntary, not-for-profit hospitals under the provisions of the unique "63-20" rule. [Ref. 21] Under the "63-20" rule, the Internal Revenue Service allows tax-exempt offerings if the borrowing hospital agrees to turn over its properties to a city, county or other political subdivision when the debt is retired. The issue concerning the advantages

of tax-exempt financing for hospitals, however, is debatable because of the full reimbursement for interest expenses by third-party payers. As long as Medicare/Medicaid and hospitalization insurers accept the inclusion of interest expense in the calculation of the daily patient charge, it will make little difference to the hospital what interest rate it pays.

Although not a consideration for the governmental hospital, the private hospital's use of debt financing is now a vitally important source of funding, and the proportion of debt capital to other funding means is expected to increase throughout the health-care industry.

b. Leasing

Off-balance-sheet financing for medical equipment is beginning to gain considerable impetus, at least in the private sector of the health-care industry. Medical equipment manufacturers and third-party leasing companies offer a variety of leasing options to hospitals and communities from individual items of equipment to entire fully-equipped hospitals. The leasing option available for medical technical equipment, although not the panacea for all hospitals, does provide a viable alternative which should be considered in conjunction with the other alternatives of buying, and borrowing and buying.

(1) Advantages. There is no accurate count of the number of hospitals which actually participate in some form of leasing, although most hospital authorities agree

that there are at least four major advantages which accure to hospitals which do consider leasing as an option to buying.

(a) *Capital Conservation*. Payments for leased equipment are made out of annual operating funds as opposed to capital investment funds.

(b) *Third-party Reimbursement*. Third-party reimbursement is almost always assured in the case of annual lease payments as the lease payments are considered a part of the hospital's operating costs. There are some inherent difficulties, which will be discussed later, with respect to the form of lease contract which may negate this advantage.

(c) *Hedge Against Technological Obsolescence*. Certain items of medical equipment which have not yet achieved the "state-of-the-art" are risky items to purchase outright. Many lease companies assume the risk of technological obsolescence and assure their lessees of up-to-date equipment as new developments become available. It is probably safe to assume that there will be additional costs involved, but these costs should be identified in the lease contract for comparison with the potential losses resulting from owning the equipment in the first place. One hospital in Albany, New York purchased a $32,000 multiple-test chemical blood analyzer in 1968, only to realize ten months later that the unit was already out-dated and that it needed to be replaced. The Albany hospital replaced the

analyzer, by then worth only $10,000 in salvage, with a leased unit which has since been replaced several times by the lessor. [Ref. 23]

(d) Tax Shield. An advantage accruing only to the for-profit hospitals, lease payments are tax deductable.

(2) Disadvantages. The disadvantages of leasing for hospitals are the same as for any other business activity. Aside from relative cost considerations, hospital administrators should take care in selecting the type of equipment to be considered, and form of the lease contract to be negotiated.

(a) Relative Cost Considerations. The gross, undiscounted costs spread out over the length of the lease contract are certain to be significantly greater than a similiar measure of costs associated with out-right purchase. Exactly how much greater is a difficult question, although some hospital authorities speculate that the lease alternative adds about twenty percent, in gross dollars, compared to the cash purchase. [Ref. 22] It is assumed that the twenty percent differential does not take into account the loss of salvage at the termination of the lease. The relative costs or benefits of the lease alternative, however, become less clearly defined when a third alternative - to borrow and buy - is proposed, as interest on the debt adds additional burden to the purchase alternative. Finally, when all three alternatives are discounted by the

calculated "cost-of-capital" to reflect the time value of money, the resulting outcome is even less predictable. It would behoove a wary equipment proposal decision-maker to insure that the relative costs of each alternative are identified before deciding which way to go.

(b) Equipment Suitable for Leasing. Equipment leasing companies will lease virtually any item of equipment desired by the hospital. It is, however, to the distinct disadvantage of the hospital to lease equipment items which have long, well-defined, and useful lives. It has been suggested that any item with a predictable life of ten years or more should be purchased out-right. [Ref. 22]

(c) Form of the Lease Contract. Lease contracts should be closely scrutinized before entering into the agreement. There are a variety of leasing arrangements, from the true lease to the lease-purchase agreements, which may be available to the hospital. It should be pointed out, however, that any contract which implies the intent on the part of the hospital to acquire the leased item (i.e. "option to buy" or "turnover" stipulations), may negate the advantage of third-party reimbursement.

C. SUMMARY

This chapter presented a broad range of topics dealing with the underlying philosophy of capital equipment budgeting in the health-care industry in general, and discussed some of the contemporary problems and corresponding solutions which manifest themselves throughout the health-care industry

and which are the object of considerable debate in current literature.

It is realized that while much of the material presented did not deal specifically with the methods by which individual hospitals develop, analyze, and fund their specific capital equipment requirements; it is suggested that such methods cannot be logically divorced from the broader and more far-reaching aspects of the delivery of health services in general. Therefore, the material presented in this chapter was arranged to acquaint the reader with a perspective about the health-care system, within which specific discussions in subsequent chapters concerning capital equipment budgeting in Naval hospitals, VA hospitals, and non-federal hospitals, will be addressed.

III. CAPITAL EQUIPMENT BUDGETING IN NAVAL HOSPITALS/REGIONAL MEDICAL CENTERS

A. OVERVIEW

The Navy health-care system provides a full range of health services to a population of over two million active duty and retired Navy and Marine Corps personnel and their dependents. At the present time, there are over 1500 Naval medical treatment facilities, ranging in scope from full service hospitals to shipboard sickbays. The workload for the Navy health-care system during Fiscal Year 1973 was reportedly over 362,000 in-patient admissions and over 21,272,000 out-patient visits. [Ref. 23] The medical care portion of Fiscal Year 1974 Navy budget, just recently appropriated by Congress, amounts to $354.6 million. [Ref. 24]

The majority of the Navy health-care system workload, 95 percent of the admissions and 78 percent of the out-patient visits, is performed by twenty-eight Naval Hospitals and Naval Regional Medical Centers located throughout the continental United States. The Naval Hospitals/Regional Medical Centers are organized and administered under the technical and management control of the Bureau of Medicine and Surgery. In addition to routine hospital services, a number of the Navy hospitals provide intern and residency training programs, conduct health-care related research and development, and furnish specialized care and treatment for complicated illnesses and injuries.

B. SYSTEM FOR CAPITAL EQUIPMENT BUDGETING

The system for capital equipment budgeting in the Navy hospitals is a long and involved process, not unlike the capital equipment budgeting systems employed by other military departments and agencies. In brief, the process begins with the identification of a need for a specific item of equipment at the department head level. This need, justified on the basis of the requesting units function or mission, is transmitted through the local chain-of-command where it is analyzed and if approved, transmitted as a single line item with the total equipment requirements budget to the Bureau of Medicine and Surgery in Washington, D. C. At BUMED, the equipment budgets from each of the twenty-eight Naval Hospitals/Naval Regional Medical Centers are segregated into specific groups of equipment types and are screened item-by-item by BUMED consultants in the appropriate medical/dental specialties. Upon completion of the technical review, the budgets are re-assembled consolidated into a total BUMED equipment budget package, and are justified at the Navy Department level for inclusion in the annual budget submission to the Department of Defense and ultimately to Congress. Once appropriations are enacted, BUMED transmits the necessary accounting data and specific approval to the field activities for procurement action. The entire cycle, from the identification of the need to the receipt of funding, encompasses twelve to eighteen months.

1. Equipment Categories

Equipment requirements at BUMED field activities are funded in a variety of categories, each with a unique set of supportive requirements. [Ref. 25]

a. Investment Equipment

Investment equipment funded within the Other Procurement Navy appropriation (OPN), includes all standard and non-standard items of equipment which have a unit cost above $1,000, have an expected life greater than one year, and are not consumed in use.

b. New Construction Equipment

New construction equipment category includes specific items of equipment required to outfit new hospital construction projects. Items in this category are generally contractor furnished and are funded through the Naval Facilities Engineering Command under specific Military Construction appropriations (MILCON), five to ten years in advance.

c. Research and Development Equipment

RDT&E project items are normally justified and technically approved as a part of a research project, and are funded through RDT&E appropriations.

d. Special Interest Items

There are a wide variety of equipment items which require specific justification and technical approval regardless of cost. Within this category are essentially all office labor saving devices, air conditioners, etc. The

Naval Supply Manual, [Ref. 26], contains a list of special interest equipment items and prescribes procedures for obtaining authority for procurement. In addition to the aforementioned administrative items, BUMED requires special interest treatment of dental chairs, dental operating units, all leased or rented equipment, and miscellaneous items under the technical cognizance of other bureaus or offices.

e. Non-investment Equipment

All equipment items under $1,000, with the exception of special interest items, are budgeted and approved locally in shopping-list format, and are funded within the local operating allotment - Operation and Maintenance Navy appropriation, (O&MN).

C. EQUIPMENT BUDGETING AT THE HOSPITAL/REGIONAL MEDICAL CENTER

The Bureau of Medicine and Surgery prescribes general guidelines within which Naval Hospitals develop their own local capital equipment investment programs. The guidelines are broad in nature and deal primarily with the regulatory aspects, the form, content, timing, and justifying documentation of capital budget submissions. A copy of BUMED's suggested outline for justification is provided as Appendix A. Within BUMED's guidelines, the individual hospital's budgeting process normally proceeds through four phases: development of requirements, verification and consolidation, analysis and review, and submission.

1. Development of Equipment Requirements

The annual equipment budget cycle generally commences in early summer with the issue of the "budget-call", an internal directive initiated by the comptroller. The clinical and administrative service chiefs, hereafter referred to as program managers, evaluate their respective equipment needs in terms of replacement and/or new equipment requirements, and prepare separate requisitions for each item over a locally specified dollar value - generally $100 per line item. The requisition, normally a locally reproduced form, contains a description of the item, its cost, urgency of need, and brief justification of need.

2. Verification and Consolidation

Each program manager's equipment budget package is verified by the comptroller budget staff. During the screening process, each line item is closely scrutinized, firm prices are obtained and justifications verified. In the case of replacement requirements, the plant property account cards of the existing items are screened and in certain instances the equipment items themselves are inspected by medical equipment repair specialists attached to the hospital. The total hospital equipment budget is then consolidated into four categories: investment equipment for the budget year, investment equipment for the budget year plus one, RDT&E equipment, and non-investment equipment.

3. Analysis and Review

Analysis and review of the hospital equipment budget is a function of the hospital budget advisory council. Although the specific composition of the council varies from hospital to hospital, the council is generally chaired by the Deputy Commanding Officer and contains senior representatives from each of the major clinical and administrative services. The function of the council is to recommend approval or rejection of specific items of equipment for concurrence by the Commanding Officer. Occasionally, the council will call upon the originator of a specific requisition to personally discuss and further justify his particular need before making final recommendation. A secondary function of the council extends to the ordering of equipment priorities. Throughout the year, as prescribed by local policy, the budget advisory council reevaluates the total investment equipment budget and places the individual items in priority sequence. The resulting equipment investment list sets forth the equipment budget plan for the current fiscal year from which BUMED funds the equipment, item-by-item, as OPN dollars become available.

4. Submission of Requirements

The hospital's equipment budget requirements are transmitted to the bureau in two increments. First, during October, the currently developed requirements for investment (OPN) equipment are submitted for technical approval, each item fully justified in writing. Second, during June just

prior to the budget year, a priority list of all previously approved but unfunded, and present approved equipment requirements, are submitted. The non-investment requirements are maintained by the comptroller in "shopping-list" format for procurement action as local operating funds become available.

5. Continuous Budget Activity

The local equipment budgeting process does not end with the submission of requirement to BUMED, but is perpetuated in the form of a continuous and constantly changing list of investment equipment requirements as noted below:

a. Updated Priority Listing

Although the budget call procedures described occur on an annual time cycle, equipment requirements are dynamic in nature, and do not always occur at a specific time each year. Emergency needs arise throughout the year as the result of unforeseen equipment failures and unplanned workload increases. As the new interim requirements occur, they are added to the command priority listing. If they involve major sums of money, or are required in the immediate future, they are communicated directly to BUMED via message or telephone.

b. Prior Year Requisitions

OPN funds received never adequately cover technically approved requisitions. At the close of the fiscal year, each hospital has OPN equipment requirements which although technically approved, were not funded. These

requisitions are automatically cancelled by BUMED and if the requirements are to be reinstated, they must be resubmitted with the July equipment budget.

D. CAPITAL EQUIPMENT BUDGETING AT THE BUREAU LEVEL

The Bureau of Medicine and Surgery enters into the hospital equipment budgeting process on two fronts. First, technical review of proposed investment equipment programs of the hospitals. Second, administration and distribution of OPN funding for the technically approved programs.

1. Technical Review

The Materiel Division of BUMED expends considerable time and effort in keeping abreast of the complex medical and administrative equipment industries. By means of frequent contact with the manufacturing industry representatives and health-care industry experts, the Materiel Division is able to develop a fairly rigorous body of knowledge about the various types of equipment available, and arrive at some informed conclusions about the use and limitations of specific items. In addition, BUMED frequently funds test and evaluation projects at selected hospitals for the purpose of further analyzing specific clinical and administrative equipment items being considered for all hospitals. It is on the basis of this knowledge, along with an understanding of the scope of the requesting hospital, that BUMED provides technical assistance to individual hospitals in terms of their respective equipment budgets. The investment equipment requisitions, received from the hospitals in October, are

separated into the various medical/dental/administrative specialties and each group is reviewed by the appropriate consultant in that area of expertise. As it happens, the consultants are frequently operating personnel, attached to various field activities, who have demonstrated their expertise in a particular technical area of specialization. At the time of this writing, the consultant for X-ray equipment is the Chief of Radiology at the Naval Regional Medical Center in San Diego, the laboratory expert is the Chief of Pathology at the Medical Center in Bethesda, Maryland, and the administrative equipment consultant is a Medical Service Corps Captain in Code 45, BUMED. Each consultant, as he reviews his group of equipment requisitions, is quite apt to telephone the originator of a particular request in order to provide additional assistance or to resolve an ambiguity noted in the requisition. Approved requisitions are maintained on file at BUMED while disapproved submissions are returned to the requesting hospitals.

2. OPN Funding Administration and Distribution

BUMED controls the purse strings. All investment equipment dollars, as well as operating allotments, are allocated to and administered by the bureau. The bureau developes and maintains the health-care contingent of the Navy's Five Year Defense Plan (FYDP). The projected health-care programs are prepared, justified, and defended to OPNAV, DOD, and ultimately Congress by staff planners and program directors at BUMED, within the constraint of an Annual Planning

Figure (APF) established at OPNAV. Although the FYDP planning is predicated on a constrained dollar limit at the five year level, BUMED's budgeting effort is devoted primarily to a detailed justification and support of the total investment package for the up-coming year. Once the total OPN appropriation has cleared Congress, and has been apportioned, BUMED faces the complex task of allocating the limited OPN dollars to the field activities. The bureau developes an initial planning allocation based upon the following three factors:

a. Percentage of Total Owned Assets

Each hospital/regional medical center, classified on the basis of the percentage of total Navy healthcare assets owned, is initially alloted an equivalent percentage of the OPN funds, as a first approximation. As an example, if a single medical center controlled eight percent of BUMED's total resources, it might be initially allocated eight percent of the OPN funds available.

b. Urgency of Need

Based upon the submitted justifications and other known factors, such as remoteness of location, BUMED is able to arrive at some qualified estimate as to the urgency of need and allocate OPN funds on the basis of intracommand priority.

c. Special Interest Programs

The bureau manages a variety of special healthcare related programs at designated field activities. Each

program, such as the "frozen blood program" and "drug screening program", requires miscellaneous items of equipment which are funded directly through the respective BUMED program manager.

E. ANALYSIS OF THE NAVY SYSTEM

The Navy health-care organization appears to utilize a fairly systematic approach toward generating, analyzing, ranking, and funding capital equipment investment programs. The levels of authority seem to be fairly well defined throughout the budgeting process. The local hospital command prerogative extends to equipment items under $1,000 (except for special interest items), and encompasses the priority sequence of technically approved items over $1,000. The Bureau of Medicine and Surgery retains technical approval authority for items over $1,000, and exerts fiscal constraint by means of the allotment process. In summary, the role of the Bureau of Medicine and Surgery with regard to the individual hospital's capital equipment budgeting process is one not unlike that of top level corporate management of a partially decentrallized, corporation. The Bureau provides a broad capital budgeting framework within which the individual hospital's generate and process their respective equipment requirements to satisfy local operating needs. It, the bureau, reviews and technically approves, or selectively rejects the equipment budget proposals on the basis of informed judgment, and allocates the resulting OPN funding in support of the approved programs on a

priority basis and by means of an implied but real capital rationing process - the limitations inherent in the legislative appropriation of taxpayer dollars.

F. CASE STUDY IN CAPITAL EQUIPMENT BUDGETING AT THE NAVAL REGIONAL MEDICAL CENTER, OAKLAND, CALIFORNIA

A brief, on-site survey of the capital equipment budgeting system utilized by the Naval Regional Medical Center was conducted in March 1974. The results of the survey are provided in the following sections.

1. Background and Organization

The Naval Regional Medical Center (NRMC), Oakland is fairly typical of a moderately large Navy health-care facility under the technical and management control of the Bureau of Medicine and Surgery. As the result of a recent innovation in Navy health-care facilities, the previously designated Naval Hospital was reorganized in 1973 as a Regional Medical Center. The Naval Hospital Oakland is now consolidated with ten Navy health-care dispensary facilities throughout the San Francisco Bay area to form a single, unified administrative command. A copy of NRMC Oakland's organization chart is provided as Appendix C.

2. Workload

Representative samples of the inpatient and outpatient workload at NRMC are as follows:

a. Inpatients

Normal bed capacity is 650 beds with expanded capabilities to 800. During 1972 NRMC Oakland admitted

13,278 patients for an average census of 590 and an occupancy rate on the expanded capacity of 76.1. [Ref. 27]

b. Outpatients

Outpatient visits during the first quarter of FY 1974 totaled 183,492 for the hospital and the ten dispensaries. [Ref. 28]

3. Operating Costs

The funds expended during the first quarter of FY 1974 totaled $3,371,846, of which $57,498 was spent on equipment. [Ref. 28] Total operating costs for FY 72 amounted to $21 million. [Ref. 27]

4. NRMC Oakland Investment in Capital Equipment

The total investment in capital equipment for the Medical Center and ten dispensaries is reportedly just under six million dollars. [Ref. 29]

5. Capital Equipment Budgeting Process

The system utilized by the Naval Regional Medical Center, Oakland, for generating equipment needs, for communicating the needs from the project managers through the chain-of-command to the Bureau of Medicine and Surgery, and the ultimate funding of the approved equipment proposals was observed to be closely aligned with the general procedures described earlier in this chapter.

a. Organization of the Budgeting Process

Within the NRMC organization, the responsibility for investment equipment in terms of generating additional and replacement needs, for coordinating the equipment

program, and for evaluating, approving, and ranking the equipment requirements, rests at essentially four levels: Program manager, Comptroller, Equipment Review Committee, and the Commanding Officer.

(1) Program Managers. The program managers, generally Chiefs of Service, are responsible for generating and documenting new and replacement equipment needs in support of their respective programs.

(2) Comptroller. The comptroller developes, coordinates, and monitors the NRMC equipment budgeting program, under the direction of the Commanding Officer; and provides liaison between NRMC and BUMED in matters pertaining to capital equipment investments.

(3) Equipment Review Committee. The NRMC Equipment Review Committee, chaired by the Deputy Commanding Officer, contains seven senior members representing major clinical and administrative services. The committee, which meets irregularly throughout the year, receives and reviews the equipment program requirements, and makes recommendations to the Commanding Officer for approval or rejection. A second function of the committee involves the ranking of technically approved equipment requirements in priority sequence for subsequent acquisition as OPN funding is made available from BUMED.

b. NRMC Budgeting Cycle

The specific cycle for capital equipment budgeting at NRMC Oakland progresses through the following steps:

(1) The budget call, an internal NRMC Notice, is published and distributed during July or August, eleven months prior to the target fiscal year. A copy of the NRMC budget call for FY-1975-76 is provided as Appendix C. At the same time, or shortly after the budget call is disseminated, the comptroller budget staff distributes to each program manager, a computer print-out which lists previously requested but unfunded equipment requirements.

(2) The program managers review their respective equipment listing in view of continuing needs and remove those items which are no longer desired. New equipment requirements are merged in priority sequence with the prior year requirements and are forwarded to the comptroller budget staff prior to the date specified in the budget call. A copy of the NRMC procurement request is provided as Appendix D.

(3) The comptroller budget staff consolidates the equipment budgets of the program managers, screens the requisitions for accuracy and completeness, and assigns requisition numbers. The Comptroller calls a meeting of the Equipment Review Council.

(4) The Equipment Review Council reviews the new budget submissions and recommends approval or disapproval to the Commanding Officer.

(5) Subsequent to the Commanding Officer's review and concurrence, the equipment budget is transmitted to BUMED in October, eight months prior to the budget fiscal year, for technical approval.

(6) Just prior to the beginning of the budget year, and at other times throughout the year as necessary, the Equipment Review Committee reconvenes for the purpose of integrating the new, technically approved budget items into the total investment equipment priority listing. The final up-date is submitted to BUMED in early July and it substantiates the equipment program which will be funded, item-by-item, as investment dollars become available through OPN.

(7) The equipment budget is perpetually up-dated throughout the fiscal year by additions, deletions, and changes in priority. Resulting changes are transmitted to BUMED as they occur, or if numerous changes become necessary at one time, the entire equipment list is re-submitted. The equipment listing is actually maintained at both BUMED and NRMC in the form of key-punched cards which can be matched, merged, added and deleted on a line-item basis.

(8) The NRMC budget cycle for expense equipment, items ranging from $100 to $999, follows essentially the same sequence except it is revolved locally without reference to BUMED beyond the total dollar requirements. A perpetual priority listing of expense equipment needs is maintained and funded on an item by item basis as dollars are made available from Operations & Maintenance Navy allotments.

c. Relationship Between Approved Equipment Needs and Resultant Funding

In the experience of NRMC, only about thirty percent of the equipment priority list is actually funded in any one fiscal year. Although in theory, the priority list should contain equipment needs for two fiscal years, in actual practice the list really represents a four to five year equipment program. The Comptroller estimates that NRMC will receive approximately $250,000 in OPN funding during FY 74 to satisfy the top priority group of items on the current equipment requirements list which totals $1.5 million. The reason for the discrepancy appears to be an over zealous submission of equipment proposals, coupled with an equipment review process that places more emphasis on ranking the proposals in priority sequence than it does on critically screening the proposals in the first place. The result of this inconsistency is an inordinately lengthy priority list, four to five times larger than the funding available in any given year.

d. Analysis of NRMC Oakland's Equipment Budgeting System

The capital equipment budgeting system employed by NRMC Oakland presents a systematic approach toward generating, analyzing, and programming the equipment needs of the Medical Center within the constraint of an implied but real capital rationing environment.

Individual investment items are apparently approved and ranked solely on the basis of informed judgment,

intuition, and by consensus of opinion. There is no indication throughout the process than any formal quantitative decision aids are utilized by NRMC in deciding among alternative investments. Committee action with the Equipment Review Council appears to be the key decision-making process around with the entire equipment budgeting system revolves at the NRMC level. In theory, given broad representation by both clinical and administrative talent, and a balanced environment of authority, the resulting recommendations should sufficiently counteract the potentially wasteful effects of marginal "pet projects." Equally important to the success or failure of the council, is the necessity for full cooperation by the hospital staff and confidence by the Commanding Officer. There is no indication at NRMC that these essential conditions have not been satisfied with respect to the Equipment Review Council. The major criticism of the Equipment Review Council relates to the inordinately large discrepancy between the number of equipment proposals approved and the number funded. As was discussed in the previous section, NRMC's equipment budget appears to be totally saturated with overly ambitious investment proposals which may or may not be funded four to five years hence. In conversations with budget staff personnel, it was revealed that the council tended to be very lenient toward equipment proposals during the initial review stages, and then tacitly disapprove the marginal proposals later by assigning very low priorities.

A number of "nice-to-have" proposals might make the priority list for a year or two, and then be withdrawn by their sponsors after the realization that the proposals would probably never be assigned a priority high enough to be funded. It is suggested that more definitive action by the Equipment Review Council at the initial review stage, would result in less administrative effort and a more relavent equipment budget priority list.

G. SUMMARY

The purpose of this chapter was to describe the general characteristics of capital equipment budgeting within the Navy's health-care system, and to discuss in detail the equipment budgeting process observed at the Naval Regional Medical Center in Oakland, California.

In summary, the capital equipment budgeting system utilized by the Navy health-care organization is closely constrained by bureaucratic regulations and statutory controls. The process is lengthly and contains inumerable levels of technical and fiscal review. The total system is difficult to assess because of its complicated inter-relationships between the various levels of authority for technical review and separate authority for fiscal determination. The authority and responsibility for the budgeting process is distributed between the local hospital and the Bureau of Medicine and Surgery, dependent upon the cost and/or end-use classification of the equipment items. BUMED, as was pointed out earlier in the chapter, provides assistance to

the hospitals in both the technical approval of the investment proposals and the resultant OPN funding to procure the approved items. There does not exist, however, any budgetary relationship between these two separate functions. In other words, there is no attempt toward adding up the dollar value of the proposals submitted for technical review for the purpose of using that dollar value as a basis for funding during the fiscal year. The technical review exists primarily as a means for insuring that each hospital is prepared with the right proposal for the right item of equipment when corresponding funds are made available. The technical approval for a specific item of equipment makes no tacit guarantee that corresponding dollars will be forthcoming.

The funding aspect of BUMED's equipment budgeting process moves in a separate sphere, and it is not clear exactly how the funding requirements are developed at the bureau level. It can probably be postulated that BUMED's OPN budget to SECNAV and above relies heavily on both current requirements and on historical data from previous years OPN budgets.

In general, the bureau like top management of a corporation, provides technical support in the form of consultant expertise and financial support in the form of OPN and O&MN dollars. The hospitals provide their own unique systems for generating, analyzing, and ranking their respective needs within the broad guidelines established by the bureau.

IV. CAPITAL EQUIPMENT BUDGETING IN VETERANS ADMINISTRATION HOSPITALS

A. OVERVIEW

The Veterans Administration, the largest single organized provider of medical care services in the United States, furnishes direct inpatient care and outpatient services to eligible VA beneficiaries from 169 VA hospitals throughout the continental United States. The projected workload for the VA health-care system during fiscal year 1974 is estimated to be over one million inpatients and over thirteen million outpatient visits. The medical care portion of the VA budget for FY 1974 amounts to \$2.656 billion, of which \$2.591 billion is earmarked for direct support of medical and health-care programs in VA hospitals. [Ref. 30]

The individual VA hospitals, classified as either "General Medical and Surgical" (GM&S) or "Neuropsychiatric" (NP), are geographically subdivided into seven VA Regions. A number of the VA hospitals are affiliated with medical schools for residency and intern training, and some hospitals conduct medical and prosthetic research programs in conjunction with or separate from the universities. [Ref. 31]

B. SYSTEM FOR CAPITAL EQUIPMENT BUDGETING

The system for capital equipment budgeting in the Veterans Administration hospitals, in a broad sense, is similar to the system utilized by the Navy for health-care activities. In

brief, the process begins with the identification of a need for a specific item of equipment at the department head level. This need, justified on the basis of replacement criteria, technological breakthrough, or on the basis of expanding workload requirements, is transmitted through the local hospital organization where it is reviewed and analyzed. If approved, the item request is consolidated with the hospital's overall budget and is submitted to the VA Regional Office and to the VA Central Office in Washington, D. C. At the Central Office, the annual budgets for all VA hospitals are consolidated and justified through the Office of Management and Budget for subsequent Congressional appropriating action. The resultant funding is distributed to the individual hospitals as target allowances. The entire cycle, from the identification of the need by the local department head, to the receipt of supportive funding from the VA Central Office, encompasses twelve to twenty-four months.

1. Capital Equipment Defined

For budgeting, funding, and control purposes, the VA defines capital equipment as any item of equipment having a unit cost of $100 or more, an expected life greater than one year, and not normally consumed in use. Like the Navy health-care system, certain specific items of equipment are controlled by the VA Central Office. Examples of items requiring technical control are: cardiac defibrillation and pace-making equipment, dental operating units, and

office labor-saving devices. Budget requirements for the controlled items must be specifically justified at the hospital level and technically approved by the corresponding Director of Field Operations in Washington, D. C. [Ref. 30]

2. VA Equipment Standards

The Veterans Administration publishes a catalog of "Equipment Life Expectancy and Use Standards," which provides a basis for allocating equipment items by the number of patient beds provided, or by virtue of an authorized clinical service or function. The equipment use standards are mandatory for all hospitals except that specific deviations may be authorized in special circumstances when fully justified by the hospital staff and by the VA Central Office. [Ref. 33] The life expectancy tables contained within the standards are used in conjunction with a formal equipment replacement program which will be described in a later section.

3. Capital Equipment Budget

Budgeting for capital equipment within the VA medical care system is divided into three separate and distinct processes: the equipment replacement process, additional equipment in support of special projects, and random additional equipment needs.

a. Equipment Replacement Program

The VA aggressively pursues a well documented and systematized equipment replacement program which provides for the orderly replacement of the capital equipment investments

at individual VA hospitals. The three stated objectives of the program are: [Ref. 34]

(1) To control equipment inventories held at field activities by means of the published use and replacement standards.

(2) To maintain a system of recording and reporting of replacement needs, projected for the current and succeeding five fiscal years.

(3) To determine the annual budget requirements necessary to maintain scheduled equipment replacements at current replacement costs.

The equipment replacement programs for individual hospitals are maintained on data file at the VA Computer Center in Austin, Texas. As new items of equipment are acquired by the hospitals, replacement data are automatically computed by adding to the acquisition date, the life expectancy derived from the "Equipment Life Expectancy and Use Standards." The new replacement requirements, programmed into the existing data base, appear on the hospital's equipment replacement up-date when individual items terminal life expectancies come within the five-year planning cycle. Each hospital receives from the computer center, an annual update of its equipment replacement listing for review and annotation as to replacement planning for items which actually need replacement earlier or later than the designated fiscal year. Exceptions to the replacement criteria are recognized and accounted for in the replacement programs where actual

experience with a specific item of equipment does not correspond with the standards. "Abnormal use" and "technological obsolescence" are acceptable justifications for moving equipment items forward on the replacement list, subject to the approval of the Hospital Director.

Upon completion of the local review, the replacement needs are priced to the estimated replacement costs and are totalled by fiscal year for consolidation into an annual planning report which is submitted to the VA Central Office. At the Central Office, the equipment replacement requirements from all VA hospitals are totalled and assembled as part of the annual budget for the up-coming fiscal year. When funding is received, a final review of the replacement program is conducted by the Field Operations Directors. When completed, the individual VA hospitals are allocated their respective portions of the equipment replacement dollars in their annual operating allotments.

b. Additional Equipment in Support of Special Projects

Budgeting for additional equipment requirements is generally initiated when new programs or expansions of existing programs are planned. The equipment requirements are programmed and justified within the major project planning package, and are submitted from the individual hospital to the VA Central Office for approval and funding. The equipment requirements portion must be thoroughly justified in writing, and are submitted to the VA Central Office in

time phase with the program completion schedules. When the budget call for supportive equipment is received from the VA Central Office, the sponsoring hospital prepares and submits VA forms 10-1348 and 10-1348a (provided as Appendix E and F) to the Central Office for approval and subsequent funding.

c. Additional Equipment Requirements Not Part of a Special Program

Budgeting for random additional equipment items remains within the prerogative of the individual VA hospitals. Items requested by department heads, which are within the range of the equipment use standards and are not specifically controlled by the Central Office, are approved within the local hospital organization and are procured through local operating allotments.

4. Analysis of the VA System

The VA health-care organization, significantly larger and more complex than the Navy organization, appears to utilize a more systematic approach to capital equipment budgeting than does the Navy. As evidenced by the three-way capital equipment budgeting process, the VA apparently attempts to segregate, or at least separately identify, the costs of maintaining its existing facilities from those costs associated with expansion and/or addition of new services. Although the primary objective of the separation is not specifically spelled out, it would appear that the inherent advantage would be the capability to justify

equipment dollars on the basis of existing vs. expanding needs. The VA Central Office can, in effect, say to Congress, "Look, we need X number of dollars in our equipment program just to replace items which are currently wearing out," or "If we are to fulfill the additional requirements of this or that program, we will need X number of dollars beyond construction costs for equipment."

The VA system seems to place more emphasis, in terms of responsibility and authority, at the local hospital level than does the Navy system. VA hospital directors, in theory, are allowed greater flexibility both in technically approving the local requirements, and in deciding which items will be acquired within the budgetary limitation. The restrictive parameters of the VA system are the specifically controlled equipment items, the VA equipment use standards, and the program support requirements. Equipment proposal decisions not covered by these restrictive parameters are made within the discretion of the hospital director, even to the extent of altering the equipment replacement program if he so desires.

An assessment of the potential disadvantages inherent to the VA system will be deferred until the close of the final section of this chapter, as it is difficult to critically evaluate the overall process before observing its operation in practice at a VA hospital.

C. CASE STUDY IN CAPITAL EQUIPMENT BUDGETING AT THE MARTINEZ VETERANS ADMINISTRATION HOSPITAL

A brief, on-site survey of the capital equipment budgeting system utilized by Martinez VA Hospital, Martinez, Calif. was conducted in April 1974. The results of the survey are provided in the following sections.

1. Background and Organization

The Martinez VA Hospital, a 498 bed General Medical and Surgical VA health-care facility in VA Region Seven, is a fairly recent plant which employes 893 personnel (full-time equivalent). In addition to the facilities located in Martinez, the VA hospital operates an outpatient clinic in Oakland and a drug treatment facility in Emeryville, California.

2. Workload

Representative workload statistics derived from the "Report of Medical Care Distribution" for the period 1 July to 31 December 1973 are provided below: [Ref. 35]

a. Inpatients

Average daily census of 384 occupied beds for an occupancy level of 77 percent.

b. Outpatients

Outpatient visits during the six month period totalled 49,630.

3. Annual Operating Costs

Total operating costs at Martinez hospital, based on Fiscal Year 1973 budget, amounted to over thirteen

million dollars. [Ref. 36] A pie-shaped graph depicting the distribution by hospital service, and a copy of the budget plan for Fiscal Year 1973 are provided as Appendix G and H, respectively.

a. Recurring or operating expenses totaling $12,037,590 accounted for 92.3 percent of the FY 73 budget.

b. Non-recurring costs of $997,921 accounted for the remaining 7.7 percent of the budget. Within the non-recurring budget costs, $325,854 was designated specifically for asset acquisition - three percent of the total operating budget.

4. Martinez VA Hospital Investment in Capital Equipment

Total investment in capital equipment assets at Martinez is reportedly just under four million dollars.

5. Capital Equipment Budgeting System

The internal equipment budgeting system utilized by Martinez is alleged to be unique among the majority of VA hospitals. Although it is not known exactly what system the other VA hospitals use, the essential difference is reported to be Martinez' use of integrated planning committees. Four committees, organized within a concept termed "Perpetual Inventory of Needs" (PIN), employ the diverse managerial talent from throughout the hospital into four specific planning areas - budgetary, equipment, space utilization, and manpower. Each committee contains representation from the clinical, administrative, and professional services. The specific authority and responsibility of the PIN committees, in terms

of the capital equipment budgeting process, will be discussed later.

a. Organization of the Budgeting Process

The responsibility for capital equipment in terms of generating replacement and additional items, for coordinating the requirements, and for analyzing and ranking the submitted requirements rests at essentially five levels: department head, supply officer, finance officer, equipment committee, and the hospital director.

(1) Department Heads. Each department head is responsible for verifying and/or justifying exceptions to his items in the equipment replacement program, and for initiating the additional equipment requirements which are separate from or a part of special programs under his jurisdiction.

(2) Supply Officer. The hospital supply officer coordinates and implements the annual equipment replacement program, and provides support and advice to department heads with respect to replacement and additional equipment needs.

(3) Finance Officer. The finance officer and his budget staff provide direction and support to the entire process, and coordinate the budget cycle in accordance with established time schedules.

(4) Equipment Committee. The equipment committee, a key component of the PIN system, meets bi-weekly for the purpose of reviewing, analyzing, and ranking the

initial and replacement equipment requirements generated by the department heads. The equipment committee acts in an advisory capacity only, recommending approval or disapproval of equipment proposals to the hospital director.

(5) Hospital Director. The hospital director provides final approval of the budget at the hospital level, and concurs with or rejects the recommendations of the equipment committee with regard to ultimate equipment investments.

b. Martinez' Budgeting Cycle

The specific cycle for capital equipment budgeting at Martinez blends in with and is a part of the total annual operating budget program. The specific steps in the order accomplished were observed as follows:

(1) The budget call, an internal memorandum is initiated during March for the up-coming Fiscal Year plus one.

(2) Department heads submit their respective equipment needs to the Fiscal Officer on individual VA requisition forms with recommended priority noted. A list of the priority codes utilized by Martinez Hospital is provided as Appendix I.

(3) The Fiscal Officer and Budget Staff consolidated equipment budget submissions with the remainder of the operating budget for review by the Hospital Director.

(4) The Hospital Director and his immediate staff review the budget submissions, accept or reject individual equipment items, and return the approved budget to the Fiscal Officer.

(5) The approved budget is prepared in smooth format and submitted to VA Region Seven, and VA Central Office during May, fifteen months prior to the budget year.

(6) A gross planning figure is received from the VA Central Office in January or February, six months prior to the budget year. Martinez Hospital prepares to defend the inevitable reduction in original budget dollars at a scheduled hearing with VA Region Seven Headquarters.

(7) A final budget is developed in April, just prior to the budget year, as the result of face-to-face meetings between Martinez staff and headquarters staff of Region Seven. Final budget, upon which funding will be based, is submitted to VA Central Office.

(8) The Equipment committee, with the approval of the Hospital Director, designates individual equipment items for procurement in priority order as quarterly allocations are received.

(9) Replacement equipment requirements, coordinated by the Supply Officer, are programmed within the separate but parallel VA Equipment Replacement Program discussed in sub-section B3a.

(10) Equipment requirements in support of special projects are budgeted as they occur within the planning stages of their respective programs and are not necessarily synchronized with the annual budget cycle.

c. Relationship Between Approved Equipment Needs and Resultant Funding

It has been the experience of Martinez hospital that annual equipment needs, in dollar terms, normally surpass the resulting funds received. Even the replacement program does not receive adequate funding to support the programmed requirements as evidenced by the actual experience for FY 1974. The Supply Officer estimates that by the close of FY 1974, only about $400,000 of the $620,000 budgeted for equipment replacement will be funded. The remaining deficit will be passed on to subsequent fiscal years, resulting in a thirty to forty percent lag in the planned replacement schedule. There doesn't appear to be any serious concern on the part of Martinez' staff about the lag in the replacement schedule, however, and it is surmized that the absence of concern is the result of two factors. First, the equipment replacement life standards may be conservatively understated. That is to say, a considerable number of items may qualify for replacement long before they actually wear out; and the hospital staff, realizing that they will never be funded up to the amount budgeted, may hedge a little during the review stages. Second, the local Hospital Director has enough flexibility to decide what money he will spend for equipment and where he will spend it. If a particular item of equipment breaks down unexpectedly, the director can re-allocate funds for replacement from other operating areas and make up the difference from special allocations or from subsequent fiscal year replacement funds.

d. Analysis of Martinez' Equipment Budgeting Process

The capital equipment budgeting system employed by Martinez VA hospital presents a systematic approach toward generating, analyzing, and programming the equipment needs of the hospital within the constraint of an implied but real capital rationing environment.

Martinez' equipment budgeting procedures are essentially bureaucratic in nature. Individual budget proposals are analyzed and ranked on the basis of statutory regulation, informed judgment, intuition, implicit value analysis, and by consensus of opinion. There is nothing in Martinez' system that is particularly note-worthy in terms of sophisticated analytical decision tools. There does not appear to be any concerted effort toward quantifying cost-benefit relations in any explicit manner. The "Perpetual Inventory of Needs" system appears, at least superficially, to be the sole management vehicle for coping with the potentially wasteful effects of marginally productive equipment investment proposals. If the four separate committees of the PIN system are well coordinated with each other, the resulting equipment planning efforts should be well integrated with the overall strategic plans of the hospital as a whole. There is some indication, however, that this total integration has not yet been achieved. As the result of discussions with certain management personnel, it was learned that the PIN system has not yet gained the full support and cooperation of the hospital staff.

D. SUMMARY

The purpose of this chapter was to describe the general characteristics of capital equipment budgeting within the Veterans Administration health-care organization, and to discuss in detail the equipment budgeting process observed at the VA hospital in Martinez, California.

As in the Navy system, capital equipment budgeting in the VA hospitals is closely constrained by bureaucratic regulation and statutory controls. The process is lengthy, in some instances more than two years between the initial equipment request and receipt of funds. It contains several levels of review, up to seven depending on the specific items. Finally, the capital equipment portion of the annual budget is almost insignificant when compared with the total operating costs.

Unlike the Navy system, the VA process separates the costs associated with replacing existing equipment from those costs attributable to new programs. Furthermore, it attempts to identify total program costs for new projects by including the equipment requirements with the other costs of construction or renovation. It appears initially that the VA system gives the local director more flexibility in technically approving equipment proposals, although this is difficult to ascertain exactly due to subtle differences in the regulatory aspects and the equipment categories.

The basic problem, inherent to both the Navy and VA health-care systems, which renders the capital equipment

budgeting process partially ineffectual, is the lack of continuity between output, or services performed, and input, or funding received. Whereas the private hospital is able to equate its revenue with the number of patients hospitalized or services performed, the federal hospital must rely on relatively inflexible budgetary resources. For the private hospital, an increase in patient workload triggers a corresponding increase in revenue which influences to a significant extent the availability of dollars for new equipment and expanded services. The inverse is also true. For the federal hospital, however, an increase in patient workload with a relatively fixed budget triggers, at least temporarily, a proportionate reduction in availability of dollars for equipment and services. The resultant effect of this inconsistency on capital equipment budgeting in federal hospitals is that the complexities of the system have led to an oversimplification of the process. In other words, the finite costs and benefits associated with patient care are so complicated to ascertain, they are normally ignored in analyzing equipment investment proposals.

V. CAPITAL EQUIPMENT BUDGETING IN NON-FEDERAL HOSPITALS

A. OVERVIEW

The contemporary community hospitals in America are the outgrowths of health-care institutions dating back to 1751 when the first general hospital opened in Philadelphia. [Ref. 37] By 1873, there were 178 hospitals throughout the United States, of which forty percent were institutions for the insane. Until the late 1900's, the hospitals provided little more than a final refuge for the critically ill and the dying. They existed primarily to care for the poor and indigent who had no place to die, or to isolate the victims of contagious diseases. The advent of aseptic surgical techniques, laboratory examinations, and X-ray in the late nineteenth and early twentieth centuries marked the beginning of health-care professionalism which literally catapulted hospital progress into the golden age of technological expertise which exists today.

1. Organization

The contemporary modern hospital, bearing little resemblance to the pathetic death-house of the mid-eighteenth century, has proliferated into an institutionalized industry of over seven thousand separate hospitals. The non-federal hospitals, which account for 94.32 percent of all hospitals in the United States, are organizationally subdivided into two major categories and six sub-categories.

Appendix J provides the numbers and relative proportions of the six categories of hospitals in the United States during 1972. [Ref. 27]

a. Long-term Hospitals

The long-term hospitals provide extended health-care services to patients suffering from chronic mental and/or physical disorders. Long-term facilities are further classified as:

(1) Psychiatric Hospitals. The majority of all psychiatric hospitals are owned and operated by state and local governments. In 1967, state and local mental health programs accounted for 66.7 percent of all mental hospitals with 99 percent of all psychiatric beds. [Ref. 37]

(2) Tuberculosis Hospitals. Also primarily the responsibility of state and local health-care organizations, tuberculosis sanatoriums have rapidly declined in number over the past two decades due to the marked decline in tuberculosis incidence. By 1972 there were only 72 tuberculosis hospitals and 13,000 beds as compared with 412 hospitals and 75,000 beds in 1946. [Ref. 27]

(3) General and Special Long-Term Hospitals. The remaining long-term care facilities concentrate on many of the non-infectious, chronic diseases such as cancer, cardiovascular disease, arthritis, and diabetes.

b. Short-term Hospitals

Short-term hospitals provide for the majority of the health-care needs in America and are subclassified

according to their institutional organization or business character.

(1) Voluntary, Non-profit Hospitals. By far the largest group of hospitals in the United States, the voluntary hospitals are for the most part organized as public service corporations within the communities they serve. In general, the voluntary hospitals are owned and operated by charitable institutions, by secular religious organizations, or by the community itself.

(2) Proprietary Hospitals. The proprietary hospitals, although not a significant portion of the total health-care institutions, are gaining considerable popularity as financial investments. During the past five years, approximately 350 hospitals have been bought and/or built by thirty corporate chains including such names as Sheraton, Ramada Inn, and Hyatt House. [Ref. 38] One author estimated that the investor-owned hospitals would net their stockholders $90 million during 1973, on a gross income of $1.8 billion. [Ref. 39]

(3) State and Local Governmental Hospitals. The state and local hospitals are organized and operated in essentially the same manner as federal hospitals. Administered as governmental institutions, these hospitals operate as functional components of their respective health departments within the state, county, or municipal governments.

2. Workload and Cost Data

Selected health-care industry workload and cost data are for the non-federal hospitals by major category is presented below: [Ref. 27]

a. Patient Care

During 1972, long-term hospitals admitted .719 million inpatients and treated 6.104 million outpatients. Short-term hospitals admitted 30.776 million inpatients and treated 166.983 million outpatients.

b. Operating Costs

During 1972, long-term hospitals spent a total of $3.971 billion, while short-term hospitals expended $25.549 billion on payrolls and other operating expenses.

c. Investments in Fixed Assets

By the close of 1972, long-term hospitals total investment in fixed assets amounted to $6.273 billion. Short-term hospitals total investment amounted to $33.629 billion, book value.

B. CAPITAL EQUIPMENT BUDGETING IN NON-FEDERAL HOSPITALS

The procedures utilized by non-federal hospitals for identifying equipment needs at the user level, for transmitting the needs through the hospital organization, and for analyzing and ranking the approved investments, vary from one hospital to another. In general, the particular capital budgeting procedures utilized by a given hospital depend upon essentially three factors. First, capital budgeting

procedures are partially determined by the organization of the hospital, whether the hospital is operated for-profit, not-for-profit, or is publically owned. Second, the budgeting process is significantly influenced by the varying sources of capital funds available for investment. In general, the major sources of capital for non-federal hospitals are internally generated operating income (including funded depreciation reserves, proceeds from the sale of assets, endowment income, etc.); federal, state, and local governmental assistance; short and long term borrowing; philanthropy (including gifts from corporations, foundations, and individuals); and proceeds from organized community fund drives. Third, the budgeting process is influenced to a lesser extent by the hospital's financial accounting and reporting system, and management information system.

There are two primary categories of criteria within which most capital equipment investment proposals are evaluated in hospitals - the degree of urgency and relevant quantitative and qualitative factors.

1. Degree of Urgency

Most hospitals utilize some system of ranking capital investment proposals by priority. Such categories as urgent, essential, economically desirable, and generally desirable provide the basic subdivisions within which all hospital investment proposals can be evaluated and approved or rejected. [Ref. 40] Every hospital generates a group of urgent needs

which cannot be postponed to a later date because they are critical to the survival and well being of the patients. At the other end of the priority scale are the investment proposals which are generally desirable or nice-to-have items which could be postponed indefinitely without affecting the mission or scope of the hospital. These two extremes provide little difficulty in the analysis stage as the former proposals must be funded, while the latter proposals may have to wait for some financial windfall. It is the two middle categories, essential and economically desirable, which provide the most difficult problems in the analysis stages. One of the major disadvantages of the degree of urgency for project evaluation is that it is not readily measurable, making comparisons between projects nearly impossible.

2. Analysis Factors

The health-care industry has not yet achieved the expertise in the use of quantitative investment decision analysis of some other industries. This fact is due primarily to the difficulties encountered in attempting to equate precise benefits derived with the corresponding funds invested. Hospitals, as providers of an essential public service, must frequently make capital investments in certain clinical services and functions which will never provide even a simple, undiscounted return on the dollars invested. Furthermore, it is difficult to fully anticipate the extent to which many services will be utilized, even when they are

discretionary to the hospital as opposed to required by the community. A number of capital equipment investment proposals undertaken by hospitals do lend themselves to an analysis of the various quantitative factors. This type of proposal typically deals with administrative or productive equipment which can be accurately measured in terms of inputs and outputs. Current health-care literature contains numerous examples of the types of projects analyzed, both quantitatively and qualitatively, and describes some of the analytical techniques utilized.

a. Cost Benefit Analysis

A quantitative technique, or group of techniques which involve comparisons of the proposed benefits attributed to the project with the estimated costs of its implementation. An example of a cost benefit analysis, presented in a recent issue of Hospitals, described a study undertaken by the VA Administrative Research Department in 1967. [Ref. 41] The purpose of the study was to determine whether or not automated conveying systems in hospitals were actually meeting their expectations. Four equivalent hospitals, three with manual systems and one automated, were closely scrutinized in terms of operating costs, labor, maintenance and power, and amortized capital investment. A fairly rigorous comparison of the automated versus manual systems resulted in the conclusion that the pneumatic conveying systems were not as economically feasible as was originally thought, and it was decided to eliminate them from future hospital construction programs.

b. Discounting Techniques

The use of present value and discounted rate-of-return methods for ranking investment proposals appears to be relatively rare within the health-care industry. Again, the reasoning against such scientific methods seems to originate with the difficulty in equating revenue with services provided. The old argument concerning the unquantifiable nature of "better patient care" returns to the surface. The author of one article proposes the use of percentage weights assigned to non-quantifiable benefits such as "lifesaving potential" and "availability of services". The percentage weights, assigned by the decision-makers, would be summed and multiplied by the total hours estimated for the life of the item to produce an output rating. The resulting output rating then could be equated to the net cost of the proposal in deriving a present value for comparison with other competing proposals. [Ref. 42]

One particularly annoying problem inherent to this attempt at quantifying precisely the subjective judgments of selected individuals, is that it will undoubtedly result in significant precision, perhaps to the penny, which may be mistakenly accepted as undisputable fact by an unwary manager. Admittedly, value judgments have to be made somewhere throughout the budgeting process; but, in the opinion of the author of this thesis, the subjective judgments should be so identified and not concealed within a mathematically precise investment analysis.

c. Nondescript Analysis Techniques

Two additional techniques for analyzing capital investment proposals value analysis and the utilities method, cannot be specifically classified as either quantitative or qualitative.

(1) Value Analysis. A functionally oriented method developed by General Electric, value analysis attempts to relate the elements of product worth to the corresponding elements of product cost in order to accomplish the required function at the least cost in resources. [Ref. 43] Included in the value analysis are appraisals of the various factors such as use, characteristics, costs, durability, acceptance, maintenance, and manpower requirements. The value analysis moves through six separate and distinct phases in analyzing an investment proposal: preparation, information, evaluation, imagination, selection, and implementation.

(2) Utilities Method. Proposals analyzed by the utilities method undergo an evaluation on the basis of projected investment needs to provide adequate services, with limited analysis of individual cost savings, or income return. The analysis of cost savings, or income return, is not considered critical in the utilities method since it is assumed that the demand for the service is relatively inelastic and the hospital's allowable rate structure will ultimately provide a satisfactory recovery of the investment in capital. The utilities method is probably the basis for

many intuitive decisions, although it is seldom explicitly identified as such. [Ref. 40]

C. CASE STUDY IN CAPITAL EQUIPMENT BUDGETING AT THE FAIRMONT GENERAL HOSPITAL

A brief, on-site survey of the capital equipment budgeting system utilized by Fairmont General Hospital was conducted during the first week of April 1974. The results of the survey are provided in the following sections.

1. Background and Organization

Fairmont Hospital, classified by the American Hospital Association as a long-term, acute health-care facility, is one of two country operated hospitals serving the health needs of Alameda County California. [Ref. 27] Fairmont Hospital, located in the city of San Leandro, is organized within the Health Care Services Agency of Alameda County, and is directly responsible to the South County Regional Director of Health Care Services. Although classified as a long-term facility, Fairmont also provides 169 of its total 480 beds for short-term patient care. Beyond the routine services provided by most long and short term hospitals, Fairmont additionally provides specialized care in acute medicine, orthopedic, neurological, respiratory, intensive rehabilitation, tuberculosis, chronic disease, and drug detoxification. [Ref. 27]

2. Workload

The workload of Fairmont Hospital, based upon 1973 data, is as follows:

a. In-patient Care

During 1972 Fairmont admitted 3500 patients for an average census of 309 and an occupancy rate of 61.7 percent. [Ref. 27]

b. Out-patients

Over 40,000 out-patient visits were recorded for 1973.

3. Annual Operating Costs

Operating costs for Fiscal Year 1974 are budgeted at approximately ten million dollars, of which $50,000 is earmarked specifically for initial and replacement equipment.

4. Investment in Equipment Assets

Fairmont's total investment in capital equipment assets is reportedly $837,000. at gross book value.

5. Capital Equipment Budgeting System

Fairmont Hospital, one of twenty-three separate operating units of the Alameda County Health Care Services Agency, budgets for and receives funding for operations and investment through the Alameda County government.

a. Organization of the Budgeting Process

The responsibility for capital equipment in terms of generating additional and replacement requirements, for coordinating overall requirements, and for ultimate approval and funding of the requirements rests at essentially five levels: the hospital department heads, the hospital administrative staff, the Agency Budget Officer, County Administrator, and the Alameda County Board of Supervisors. [Ref. 44]

(1) Department Heads. Each department head is responsible for the custody and security of the equipment assigned to his/her department. In addition, department heads are responsible for generating and budgeting for replacement and additional equipment requirements as needed.

(2) Administrative Staff. The Hospital Administrator and administrative staff are responsible for coordinating the equipment budget requirements of the department heads, for analyzing and approving/rejecting the individual equipment items, and for submitting the approved requirements as a portion of the total operating budget through the Alameda County organization.

(3) Agency Budget Officer. Established at the Health Care Services Agency level, the Budget Officer is responsible for assisting each of the twenty-three budget units with the technical preparation of their budgets. In addition, the Budget Officer resolves any questions or concerns which may arise about budget procedure, and consolidates the total health care services budget of Alameda County.

(4) County Administrator's Office. The County Administrator's Office maintains a full-time staff for the purpose of providing administrative analysis to the various county departments and agencies. The two basic responsibilities of the budget staff are the review and control of the county-wide annual budget in terms of available financial resources, fiscal trends, policy decisions and appropriate legislation or statutes.

(5) County Board of Supervisors. The Board of Supervisors retains the final authority in the budget process. The Board reviews the Health Care Services portion of the County Administrator's Budget message and conducts public hearings as the final step in the budget process.

b. Fairmont's Equipment Budget Cycle

The specific cycle for capital equipment budgeting at Fairmont is an integral part of the total annual operating budget program. The steps in the process are provided in chronological order as follows:

(1) During October, nine months prior to the beginning of the budget fiscal year, the budgeting process is initiated with a planning meeting between the Assistant Administrators and their respective subordinate department heads. The purpose of the initial meeting is to discuss the technical submission requirements and due dates as stipulated by the Agency Budget Officer.

(2) Department heads develop their respective equipment needs and submit them via the local chain-of-command to the Administrator on a local Fairmont form, provided as Appendix K. The individual line-item requests are justified in terms of replacement equipment for old or unserviceable items, additional equipment for existing programs, or new equipment for new programs. [Ref. 44]

(3) Each equipment request is analyzed and approved or rejected by the Assistant Administrators and Administrator's budget staff. The approved items are ranked

as to the urgency of need - essential, important, or expendable. The requests are then grouped by hospital department or service and are listed on a consolidated Equipment Request form, for submission with the annual budget request. An attachment to the Equipment Request form contains a detailed description of each line item, the recommended priority, a brief explanation of need, and an appraisal of adverse effects if the request is denied.

(4) A preliminary budget request is drafted and submitted to the Assistant Agency Director for review. The purpose of the preliminary budget is to insure complete and proper justification of programs, compliance with agency wide format, and accuracy of computations. Fairmont's preliminary request for fiscal year 1974-1975 was due on 9 November 1973.

(5) Based upon the recommendations by the Assistant Agency Director on the preliminary budget, Fairmont's staff prepares the final budget for submission to the Health Care Services Agency for final review and approval. Fairmont's final budget was due for submission on 18 January 1974.

(6) During the interim, budget hearings are conducted at both the Assistant Agency Director and Agency Director levels. The Assistant Agency Director and his staff of analysts discuss the preliminary budget with the hospital staff, while the Agency Director administers the final budger request hearings. Differences of opinion may be resolved

informally at the Assistant Director level; however, if the differences persist beyond the preliminary stage, they must be resolved formally at the Agency Director hearings by means of "Policy Decisions."

(7) The final steps in the budget process are the printing and distribution of the Alameda County Administrator's consolidated budget, and the hearings and passage by the County Board of Supervisors.

c. Relationship Between Hospital Approved Equipment Needs and Resultant Funding

Historically, it has been the experience of Fairmont Hospital that annual equipment proposals significantly out-distance the corresponding funds received. In gross dollar terms, the equipment requirements for FY 74-75, as submitted by the department heads, totalled $150,000. Fairmont Administrator staff reduced the total requirements by $50,000, and submitted a preliminary estimate of $100,000. Actual funding received amounted to $50,000 after preliminary and final hearings and reviews.

d. Analysis of Fairmont's Capital Equipment Budgeting System

The capital equipment budgeting system employed by Fairmont Hospital presents yet another bureaucratic system, not unlike the systems employed by the Navy and Veterans Administration. The process appears to be a fairly systematic approach toward generating, analyzing, and programming the equipment needs of the hospital within the constraints of a severe capital rationing environment. The

process is planned and executed far enough in advance to provide for the year-to-year requirements generated at the department head level, although there is no apparent attempt toward programming needs beyond the up-coming fiscal year.

There was no evidence available to indicate that any formal quantitative decision aids were utilized in analyzing equipment proposals at the hospital level. It was suggested, however, that some department heads used rough pay-back calculations during the initial stages of their budget developments; and it might be deduced that the budget analysts, under the Assistant Agency Director, would employ systematic cost-benefit analysis in trimming imaginary budget. In any event, if the equipment budgeting process is as defensive as implied, due to severe capital rationing constraints, it might be reasonable to expect that many of the proposals have only two alternatives anyway - replace, or discontinue service. This theory is further supported by the requirement for a comment in the justification for "an appraisal of adverse effects if the request is disapproved."

One redeeming feature of Fairmont's capital budgeting process is the diversity of interest groups at the various levels of review. Each level looks at the hospital's equipment proposals from a slightly different viewpoint. The Fairmont administrative staff and the Health Services Agency Directors as health-care professionals, could be expected to lend support to the hospital's position. The

Alameda County Administrator, on the other hand, must consider other competing County services such as the Sheriff and Highway departments in deciding budgetary issues. The final authority, in effect the County tax-payers through the political mechanism of the Board of Supervisors, takes an even broader look at the hospital budget in terms of total governmental services demanded balanced against the dollar resources available.

D. SUMMARY

In summary, the purpose of this chapter was to describe the general characteristics of capital equipment budgeting within the third and largest area of the health-care industry, the non-federal hospitals; and to discuss in particular, the equipment budgeting process observed at Fairmont General Hospital in Alameda County, California.

The non-federal hospitals as a whole are actually three diverse, loosely-connected groups of service oriented institutions. While all three groups have the same primary goal, to provide patient care services to their respective communities, each differs according to its institutional character and profit motive. Perhaps the most unique feature of the non-federal hospitals, which distinguishes them from the Navy and VA hospitals, is the inherent correlation between patient services provided and corresponding revenue earned. Even Fairmont hospital, which is essentially a bureaucratic governmental institution, has some measure of income to output as many patients are "paying" customers,

either through third-party payers or on a cash basis. Even though Fairmont's earned revenue revolves through the Alameda County treasury, the hospital can still point to rising revenues in justifying expanding needs.

In spite of the non-federal hospital's increased capability toward quantifying both costs and benefits; it does not appear, from current literature nor actual observation, that they are any more sophisticated in their capital budgeting procedures than are the Navy and VA hospitals. The individual equipment proposals are again, for the most part, evaluated and approved or rejected solely on the basis of informed judgment, intuition, and consensus of opinion.

VI. CONCLUSIONS

Before going into specific conclusions regarding capital equipment budgeting in the health-care industry, it might be worth-while to digress a little and discuss the relative importance of the various elements of hospital costs which contribute to the overall rising costs of health-care as a whole. First, it has become apparent from researching the current literature and from conducting on-site surveys of three separate hospitals that labor costs are by far, the largest expense in operating a hospital. American Hospital Association statistics place payroll costs at just under sixty percent of total operating costs, industry wide. Second, combined with consumable supplies expenses, the day-to-day costs to staff and operate an average hospital amounts to well over ninety percent of the total annual budget. The labor and consumable supplies expenses for the three hospitals surveyed accounted for 94 percent of NRMC Oakland's budget, 92 percent of Martinez' budget, and 99 percent of Fairmont's budget. Third, it becomes apparent that the remaining dollars available for capital equipment investments is relatively insignificant in comparison with the recurring expenses.

This development then, the proportionate insignificance of investment dollars, leads to one of the annoying questions which has recurred throughout this thesis - Just how elaborate a system is really necessary for managing capital

equipment investments amounting to less than five percent of the total operating budget? The answer is not as simple as might first appear because there may exist one of two opposing conditions which could yield such a small capital investment outlay. First, the hospital might be so well equipped that it is unable to find enough proposals to invest in. Or, second, the hospital could be so destitute that it has very little funding for investment. In the former instance, an elaborate capital equipment budgeting system would probably be redundant. In the later instance, the capital budgeting system should be sufficiently elaborate to insure that every single dollar spent on capital investments, returns the highest value of benefit possible. These two extremes undoubtedly do not serve to describe the majority of hospitals in the United States, although there may exist individual cases which fit the descriptions. The three hospitals surveyed certainly were not destitute, although capital investment limitations were very evident.

A second question germane to the capital equipment budgeting system is - What exactly should the hospital equipment budgeting system do? First, it should provide the mechanics for generating the capital equipment needs of the hospital, and for communicating these needs to the decision-making authority. Second, the system should provide a vehicle for developing alternative choices to satisfy the needs. Third, it should provide for the systematic analysis of the alternative proposals in terms of benefits versus costs. Finally,

the system should establish the means for obtaining investment dollars to procure the selected proposals.

The three hospitals surveyed employ fairly elaborate capital equipment budgeting systems and all three are relatively similar, as is shown by a comparative analysis provided as Exhibit VI-1. The complexities of the three systems, however, seem to be a function of the bureaucratic process itself, rather than an outgrowth or extension of any local sophistication in financial management techniques. An assessment was made to determine the extent to which each of the three capital equipment budgeting systems satisfies the aforementioned functions.

1. Identifying the Equipment Needs

All three capital equipment budgeting systems appear to be fairly well structured in terms of identifying equipment requirements at the line manager level. Each system spells out specific procedures for communicating the needs, for documenting corresponding justifications, and for establishing user priorities. While all three systems provide for identifying replacement equipment proposals, only the VA separately accounts for the replacements. This bisecting of the equipment investment program seems to be a sound proposition, as it introduces a logical division in the decision making process between perpetuating existing operations and instituting new ones.

One pecularity of the governmental hospital's treatment of fixed assets, which influences the development and

Exhibit VI-1

Comparative analysis of the three capital equipment budgeting systems employed by the Naval Regional Medical Center Oakland, the Martinez VA Hospital, and Fairmont General Hospital.

Basis for comparison	NRMC	MARTINEZ	FAIRMONT
1. No. of beds	650	498	480
2. Organizational entity	Federal, military.	Federal, non-military	Non-federal County
3. Annual total operating costs, approximate.	$20 million	$13 million	$10 million
4. Percentage of operating costs allocated for equipment acquisition.	1.5%	2.5%	1%
5. Level of identification of equipment needs.	Program manager	Department Head	Department Head
6. Methods of communicating equipment requirements.	Local form NRMC4270/1	Local form VA 7051b	Local form 303-AB-22
7. Level of detail in equipment proposal	Item description, cost, justification priority	Same	Same
8. Replacement need vs. additional requirement	Identified only	Identified & separately accounted for	Identified only
9. Levels of review for technical approval of individual proposals.	Comptroller Equip. Rev. Comm. C.O., BUMED	Finance Officer, Director	Asst. Admin., Administrator
10. Priority ranking established by:	Equip. Rev. Comm., C.O.	PIN Comm., Director	Asst. Admin., Administrator
11. Funding approval authority	BUMED	VA Central Office	County Bd. of Supervisors
12. Approximate proportion of equipment program funded	30 to 40 percent	Same	Same
13. Leasing of medical equipment	None	None	None

subsequent analysis of equipment investment proposals, is the gross book valuation of all fixed assets. There is no apparent attempt toward associating any portion of the plant and equipment costs with current operating costs, except for the total acquisition cost during the fiscal year in which the items are acquired. Once acquired, the fixed assets are maintained on plant property records at the un-depreciated acquisition cost until disposed of. As a consequence, any decision to replace an existing item of equipment must be made without knowledge of the replaced items worth in terms of remaining residual value or net book value.

2. Developing Alternative Choices

What is needed here is some scheme in the budgeting system which will assist the decision-maker in selecting the right piece of equipment to do the required task - no more, no less. As was discussed in Chapter II, the medical equipment industry has become so sophisticated in recent years, that it is virtually impossible for any one busy physician to identify the "right piece of equipment." Although neither the VA nor Alameda County health-care systems specifically address this potential difficulty, the Navy system attempts to minimize the uncertainties by means of the technical review process for investment equipment. It is difficult to assess the overall effectiveness as well as the associated costs of the technical review by consultants, although it is considered to be an important part of the Navy's total budgeting process. Two essential conditions,

relative to the technical review, should be insured if the procedure is to remain beneficial. First, there should be sufficient feedback from the hospitals to the consultants to insure that the technical recommendations are accurate and current. Second, the overall administrative costs of the technical review should be scrutinized to insure they do not exceed the resultant benefits.

3. Analyzing the Proposals

All three systems surveyed analyze their respective equipment investment proposals in essentially the same manner. While each employs a formal system of review, the formality of the system seems to be directed toward satisfying the statutory and regulatory requirements of a bureaucratic hierarchy rather than toward developing any sophistication in analysis. Both the Navy and the VA hospital's rely heavily on a committee approach at the hospital level, for analyzing and ranking equipment investment proposals. This approach appears to work fairly well in both cases because of the broad representation by both clinical and administrative expertise. There are, however, potential drawbacks with the committee approach which were observed to some degree in both cases, and which should be closely monitored. First, individual committee member influence should be evenly distributed in order to minimize one-sided power plays. Second, the committee should be accorded sufficient authority and cooperation from throughout the hospital to enable it to conduct its business in an atmosphere conducive to informed and relatively unbiased judgment.

Fairmont hospital relies not so much on the committee approach as it does on informal negotiation at the Health Care Services Agency level, and formal arbitration at the County Administrator level.

In all three instances, the primary emphasis appears to be directed toward establishing a priority relationship among the competing proposals rather than toward critically analyzing the individual proposals.

4. Financing the Equipment Investment Program

The final function of the capital equipment budgeting system - obtaining investment dollars for funding the approved proposals - is the most difficult of the four functions to assess in the three systems surveyed. In each instance, the resultant funding is a matter entirely within the discretion of higher authority - Bureau of Medicine and Surgery, Veterans Administration Central Office, and Alameda County Board of Supervisors. Not one of the three hospitals retains any measure of authority for directly determining the amount of investment dollars to be spent on equipment in any given fiscal year. Each hospital receives a fixed statutory dollar limitation within which it must finance its equipment needs for the up-coming fiscal year. Exactly how the dollar limitation is developed within the bureaucratic process of each system was not specifically addressed in this thesis, although it seems to be independent of documented need generated at the individual hospital level. It might be surmized that the total dollars available in

each of the three cases is more directly a function of historical data from prior year budgets, and actual funding available, than from any correlation to current equipment needs. This generalization may describe to a lesser extent the VA system due to its attempt toward separately identifying equipment replacement requirements.

In the final analysis, two prime criticisms can be generalized against the capital equipment budgeting systems employed by the Navy, the Veterans Administration, and to a lesser extent the Alameda County Health-Care systems. Both criticisms appear to derive from inconsistencies inherent to the governmental bureaucracy rather than from specific difficulties at the individual hospital level.

First, the governmental process introduces a lack of continuity between output or services performed and input or funding received. This lack of continuity, discussed at length in the Summary of Chapter IV, renders the finite measurements of costs versus benefits relative to patient care so complicated, yet inconclusive, that such measurements are generally ignored in the equipment budgeting process. Hence, capital equipment investment proposals are, for the most part, analyzed and approved or rejected solely on the basis of subjective rather than objective analysis.

Second, the governmental process also introduces a lack of correlation between the generated equipment investment proposals and the resultant funding. The individual hospitals in general, and the Navy in particular, in

anticipation of receiving equipment dollars which bear little or no resemblance to the approved proposals, tend to saturate the budgeting system with equipment proposals and then selectively procure only those proposals which fall within the funding limitations in priority sequence. Hence, the funded equipment investments amount to a small percentage of the total requirements generated - no more than twenty to thirty percent at the three hospitals surveyed.

Broad recommendations for minimizing the potential deficiencies are difficult to postulate in this thesis as the deficiencies noted are more attributable to the governmental bureaucratic system in general, than to the health-care portion in particular. However, two specific recommendations for the Navy health-care system, which have already been alluded to, can be drawn from this study.

First, at the system-wide level, a more definitive split in the budgeting process between equipment replacement requirements and new program requirements, as utilized by the VA, might be beneficial toward separately identifying those costs associated with continuing current operations from the costs incident to new or expansionary programs.

Second, at the NRMC Oakland level, increased emphasis by the Equipment Review Council toward screening out the marginal investment proposals during the initial review in October would reduce the necessity for tacitly rejecting them later by means of the priority system. The result of more critical analysis during the initial review would be

less administrative effort and a more relevant equipment requirements list.

APPENDIX A: EQUIPMENT JUSTIFICATION

1. The first sentence of the justification shall provide a complete nomenclature of the item, including the common or trade name, make, model, FSN, etc.

2. Substantiating statements should not be merely conclusive in nature, but should contain facts and data to support the requirement as set forth below to assist BUMED in reviewing equipment requisitions.

a. Will the items requested most satisfactorily accomplish the desired result economically? In this connection, a far more elaborate and expensive piece of equipment should not be requested to do a particular job which can be satisfactorily accomplished by a less expensive model or item.

b. Will acquisition of equipment require special installation or structural changes resulting in additional charges over and above the cost of the equipment itself? If so, the cost of equipment installation shall be included as a separate line item. Projects beyond the funding authority of the commanding officer shall be submitted as Equipment Projects in accordance with reference (b).

c. Will the item requisitioned introduce a new technique? And if so, is the staff qualified to utilize the item?

d. Is the item being replaced because it has been determined to be obsolete? This question reflects directly on the ability of the item to accomplish a certain function and should not be used as justification for replacing a perfectly good piece of equipment for esthetic reasons alone. Information should be provided on the manner in which the equipment is obsolete; i.e., wherein it fails to accomplish the job as well as would a particular new piece of equipment.

e. Is there valid reason for requesting replacement of a large portion of the major items of equipment of a single service or division or an unusual number of similar items at one time? Each treatment facility should have a planned equipment replacement program whereby a reasonable number of items are to be replaced, if necessary, each year. Concentrating procurement of new equipment into any one year distorts the fiscal picture for that activity and prevents the development and adoption of an orderly replacement program.

f. Will a standard item meet the requirement? By regulations, the naval service is enjoined to use standard items to the utmost. When the procurement of nonstandard equipment is considered mandatory, the originating request document shall be approved by the commanding officer and shall contain a certification that no standard stock material is suitable.

g. Does the requested item sustain or enhance the operation of the treatment facility? New departures must be carefully analyzed to ascertain whether they are well founded or merely a fad.

h. How old is the item? If it was acquired as a used item, the requisition should so state. How many breakdowns has the item had in the past year or some other specified period? What was the cost of these breakdowns and what were the resulting inconveniences? Is a complete overhaul or thorough repair at the present time more feasible than replacement? Are parts still available?

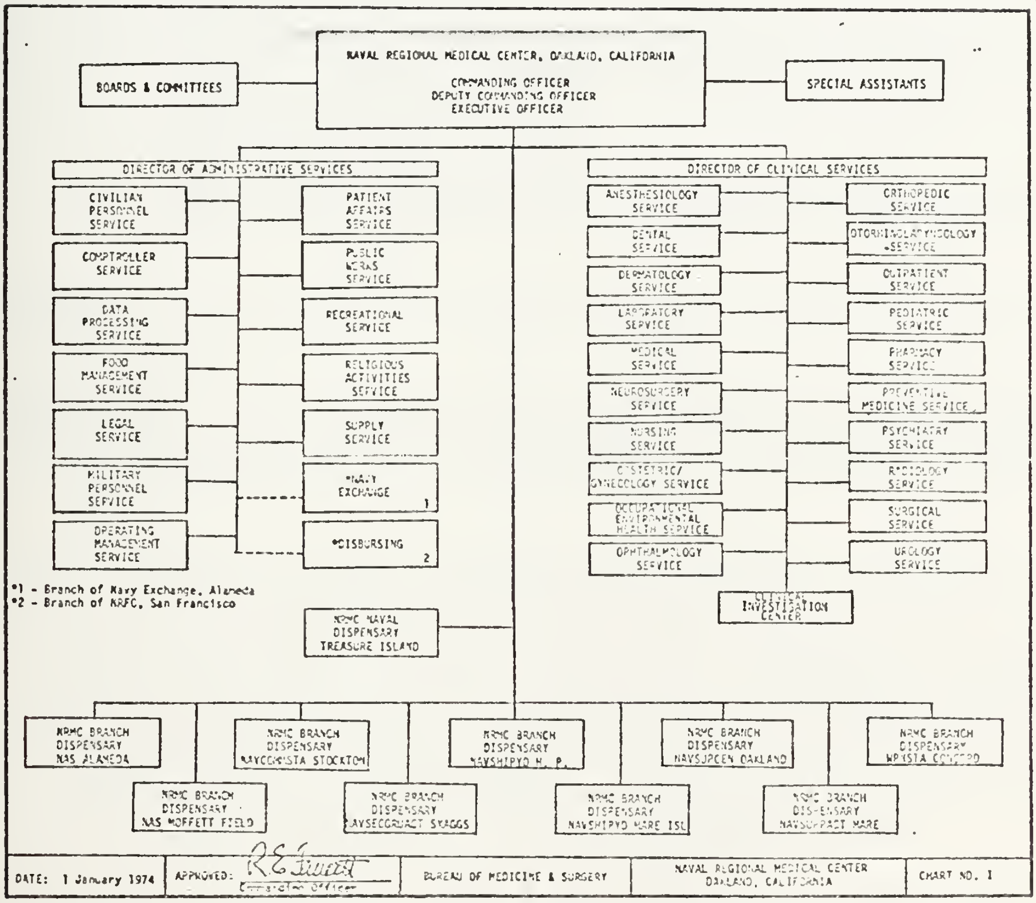
3. Note in the requisition the various equipments considered by the command, the reasoning prompting rejections, and the differentiating data which lead to selection of the requested item.

4. NAVFAC P-352 establishes the expected life for quarters furniture. The American Hospital Association Handbook: Uniform Chart of Accounts and Definitions for Hospitals, contains tables of life expectancies for hospital equipment, both technical and nontechnical. These tables can be useful as a guide in determining whether or not a piece of equipment has been in use for a reasonable length of time.

5. Specification, purchase descriptions, and accounting data shall be included in requisitions as specified in NAVSUP Manual and directives.

6. The current estimated cost shall be indicated opposite each item on a purchase requisition. This estimated cost shall include any anticipated installation costs. Contingencies shall not be shown as separate items. However, a 5 per cent increase per line item cost will not require additional Bureau funding approval.

APPENDIX B: NRMC OAKLAND ORGANIZATION CHART


NAVAL REGIONAL MEDICAL CENTER, OAKLAND, CALIFORNIA
COMMANDING OFFICER
DEPUTY COMMANDING OFFICER
EXECUTIVE OFFICER
BOARDS & COMMITTEES
SPECIAL ASSISTANTS
DIRECTOR OF ADMINISTRATIVE SERVICES
CIVILIAN PERSONNEL SERVICE
COMPTROLLER SERVICE
DATA PROCESSING SERVICE
FOOD MANAGEMENT SERVICE
LEGAL SERVICE
MILITARY PERSONNEL SERVICE
OPERATING MANAGEMENT SERVICE
PATIENT AFFAIRS SERVICE
PUBLIC WORKS SERVICE
RECREATIONAL SERVICE
RELIGIOUS ACTIVITIES SERVICE
SUPPLY SERVICE
*NAVY EXCHANGE 1
*DISBURSING 2
*1 - Branch of Navy Exchange, Alameda
*2 - Branch of NRFC, San Francisco
NRMC NAVAL DISPENSARY TREASURE ISLAND
DIRECTOR OF CLINICAL SERVICES
ANESTHESIOLOGY SERVICE
DENTAL SERVICE
DERMATOLOGY SERVICE
LABORATORY SERVICE
MEDICAL SERVICE
NEUROSURGERY SERVICE
NURSING SERVICE
OBSTETRIC/GYNECOLOGY SERVICE
OCCUPATIONAL ENVIRONMENTAL HEALTH SERVICE
OPHTHALMOLOGY SERVICE
ORTHOPEDIC SERVICE
OTORHINOLARYNGOLOGY SERVICE
OUTPATIENT SERVICE
PEDIATRIC SERVICE
PHARMACY SERVICE
PREVENTIVE MEDICINE SERVICE
PSYCHIATRY SERVICE
RADIOLOGY SERVICE
SURGICAL SERVICE
UROLOGY SERVICE
CLINICAL INVESTIGATION CENTER
NRMC BRANCH DISPENSARY NAS ALAMEDA
NRMC BRANCH DISPENSARY NAS MOFFETT FIELD
NRMC BRANCH DISPENSARY NAVCOMMSTA STOCKTON
NRMC BRANCH DISPENSARY NAVSECGRUACT SKAGGS
NRMC BRANCH DISPENSARY NAVSHIPYD H. P.
NRMC BRANCH DISPENSARY NAVSHIPYD MARE ISL
NRMC BRANCH DISPENSARY NAVSUPCEN OAKLAND
NRMC BRANCH DISPENSARY NAVSUPPACT MARE
NRMC BRANCH DISPENSARY NWSTA CONCORD
DATE: 1 January 1974
APPROVED:
Commanding Officer
BUREAU OF MEDICINE & SURGERY
NAVAL REGIONAL MEDICAL CENTER OAKLAND, CALIFORNIA
CHART NO. 1

APPENDIX C: NRMC OAKLAND NOTICE 4235, 8 AUGUST 1973

From: Director/Commanding Officer

Subj: Equipment Requirements for Fiscal Year 1975-1976; submission of

Ref : (a) BUMEDINST 4235.5D

Encl: (1) IBM Listing of FY 1974 Investment Items by Program Manager (NOTAL)
(2) IBM Listing of FY 1975 Investment Items by Program Manager (NOTAL)
(3) Copy of Procurement Requests previously submitted for FY 1976 Investment Items (NOTAL)

1. Purpose. To provide instructions for submission of equipment requirements.

2. Background. By reference (a), this command is required to submit not later than 1 October 1973 the equipment budget for all OPN Equipment (Unit Cost $1,000 or more) for FY 1975 and FY 1976.

3. Justification. BUMED Instruction 4235.5D, enclosure (1), requires that the first sentence of justification shall provide a complete nomenclature of the item, including the common or trade name, make, model, FSN, etc. Program Managers are required to use this format in the justification column of the Procurement Request. A well written justification, using enclosure (1) of reference (a) as a guide line, will assist both the command and BUMED to properly evaluate the need and priority sequence for each equipment item.

4. Technical Assistance. Mr. Sesto, Extension 2315, Regional Supply Department is available to provide any technical assistance necessary. Enclosures (1) through (3) and enclosure (1) of reference (a) will be delivered by Supply Department personnel

a. Review requisitions, enclosures (1) through (3) previously submitted, and take the following action.

(1) Draw a line through any item listed on enclosure (1) and (2) no longer desired.

(2) Annotate "cancelled" on any requisition enclosure (3), no longer desired.

(3) Prepare procurement requests with justification as outlined in paragraph 3 for additions. New procurement requests are not required if previously submitted and listed on enclosure (1) through (3). The command must furnish the plant account number to BUMED for all equipment replacement items. Program Managers must ANNOTATE on the Procurement Request the plant account number, if applicable.

b. BUMED requires submission of equipment needs in priority order. To provide BUMED a list based on an evaluation of the needs for the Center as a whole, an equipment evaluation committee has been formed which will represent all Program Managers and make recommendations to the Director/Commanding Officer. To assist the committee in making the proper determination, the Program Managers will annotate on each Procurement Request one of the following classifications:

(1) A. Urgent. Item required to carry out mission. If not procured, there would be a substantial reduction in capability.

(2) B. Essential. Item required to accomplish current workload. If item is not procured within next fiscal year, the workload would be limited or reduced.

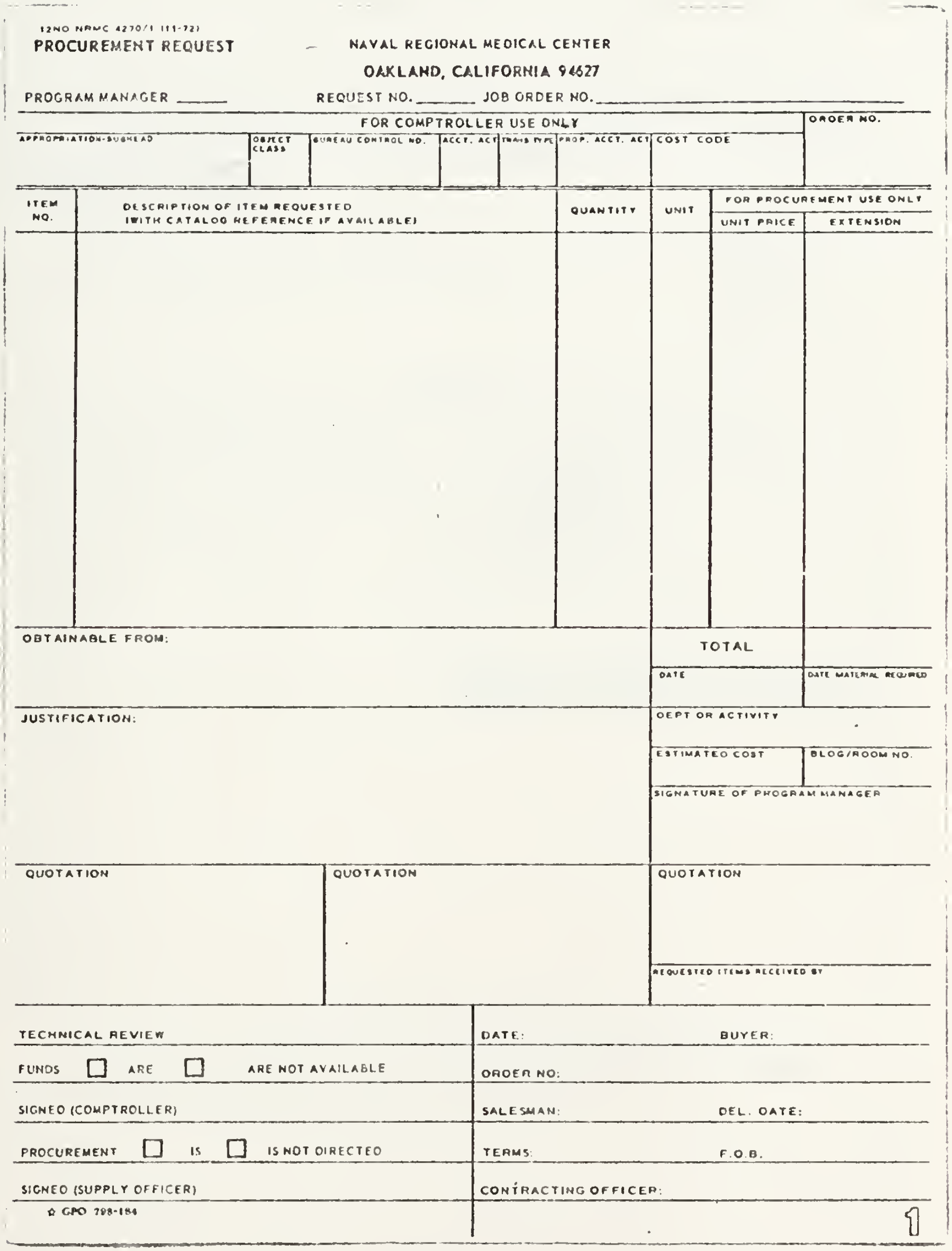
(3) C. Necessary. Item needed to update obsolete item or increase productivity.

(4) D. Desirable. All items not in classes (1), (2), or (3).

c. Submit requisitions for additional requirements for fiscal years 1975 and 1976 investment equipment and an annotated copy of enclosures (1) through (3) for cancelled items to the Regional Supply Department as soon as possible, but no later than 20 August 1973.

/s/
R. E. Faucett

APPENDIX D: NRMC PROCUREMENT REQUEST



12NO NRMC 4270/1 (11-72)

PROCUREMENT REQUEST — NAVAL REGIONAL MEDICAL CENTER

OAKLAND, CALIFORNIA 94627

PROGRAM MANAGER ______ REQUEST NO. _______ JOB ORDER NO. ______

FOR COMPTROLLER USE ONLY

APPROPRIATION-SUBHEAD	OBJECT CLASS	BUREAU CONTROL NO.	ACCT. ACT	TRANS TYPE	PROP. ACCT. ACT	COST CODE	ORDER NO.

ITEM NO.	DESCRIPTION OF ITEM REQUESTED (WITH CATALOG REFERENCE IF AVAILABLE)	QUANTITY	UNIT	FOR PROCUREMENT USE ONLY	
				UNIT PRICE	EXTENSION

OBTAINABLE FROM:

TOTAL

DATE

DATE MATERIAL REQUIRED

JUSTIFICATION:

DEPT OR ACTIVITY

ESTIMATED COST

BLDG/ROOM NO.

SIGNATURE OF PROGRAM MANAGER

QUOTATION

QUOTATION

QUOTATION

REQUESTED ITEMS RECEIVED BY

TECHNICAL REVIEW

FUNDS ☐ ARE ☐ ARE NOT AVAILABLE

SIGNED (COMPTROLLER)

PROCUREMENT ☐ IS ☐ IS NOT DIRECTED

SIGNED (SUPPLY OFFICER)

DATE: BUYER:

ORDER NO:

SALESMAN: DEL. DATE:

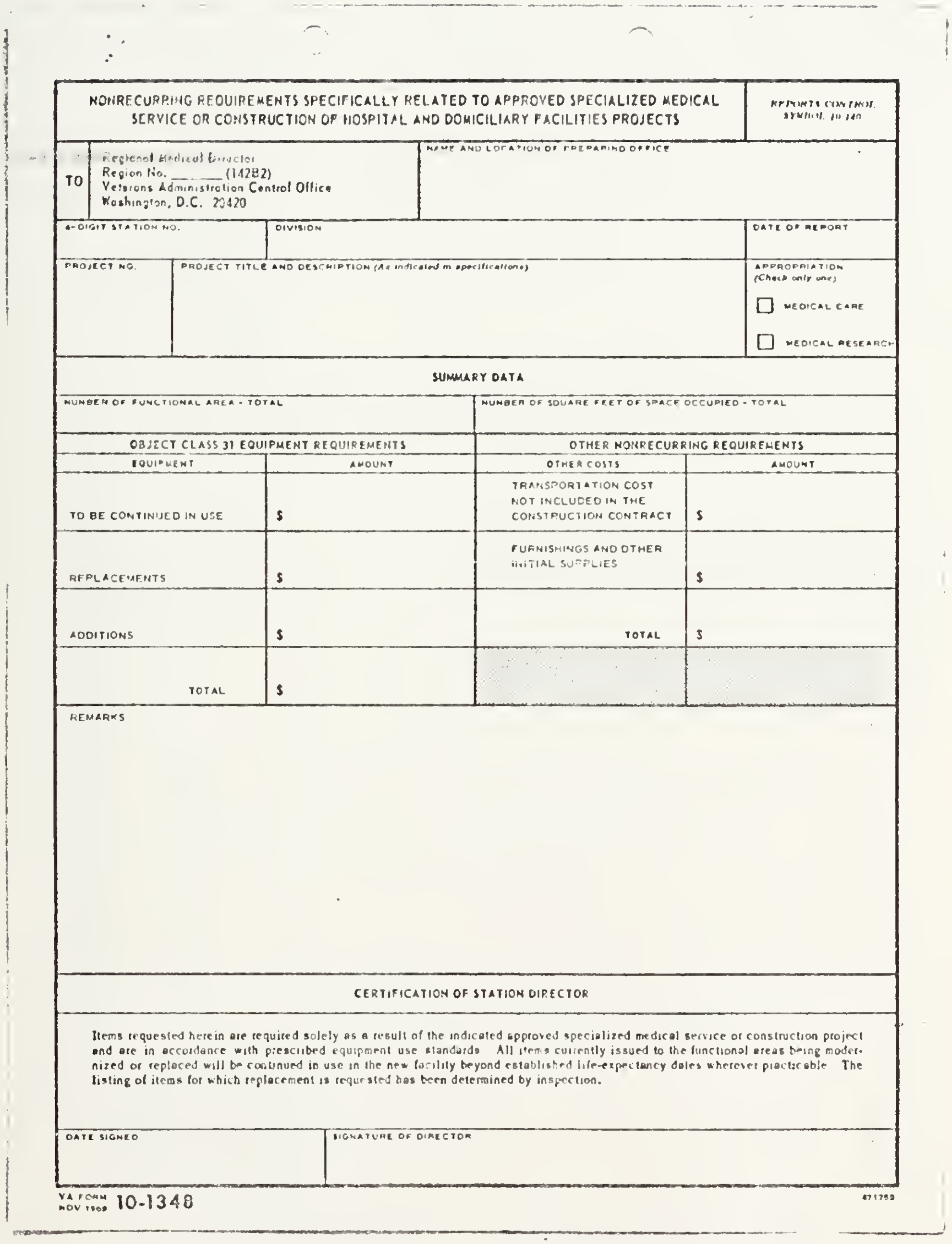
TERMS: F.O.B.

CONTRACTING OFFICER:

✩ GPO 798-184

1

APPENDIX E: VA NON-RECURRING EQUIPMENT REQUIREMENTS



NONRECURRING REQUIREMENTS SPECIFICALLY RELATED TO APPROVED SPECIALIZED MEDICAL SERVICE OR CONSTRUCTION OF HOSPITAL AND DOMICILIARY FACILITIES PROJECTS

REPORTS CONTROL SYMBOL 10-140

TO
Regional Medical Director
Region No. ______ (142B2)
Veterans Administration Central Office
Washington, D.C. 20420

NAME AND LOCATION OF PREPARING OFFICE

4-DIGIT STATION NO.

DIVISION

DATE OF REPORT

PROJECT NO.

PROJECT TITLE AND DESCRIPTION *(As indicated in specifications)*

APPROPRIATION *(Check only one)*
☐ MEDICAL CARE
☐ MEDICAL RESEARCH

SUMMARY DATA

NUMBER OF FUNCTIONAL AREA - TOTAL

NUMBER OF SQUARE FEET OF SPACE OCCUPIED - TOTAL

OBJECT CLASS 31 EQUIPMENT REQUIREMENTS		OTHER NONRECURRING REQUIREMENTS	
EQUIPMENT	AMOUNT	OTHER COSTS	AMOUNT
TO BE CONTINUED IN USE	$	TRANSPORTATION COST NOT INCLUDED IN THE CONSTRUCTION CONTRACT	$
REPLACEMENTS	$	FURNISHINGS AND OTHER INITIAL SUPPLIES	$
ADDITIONS	$	TOTAL	$
TOTAL	$		

REMARKS

CERTIFICATION OF STATION DIRECTOR

Items requested herein are required solely as a result of the indicated approved specialized medical service or construction project and are in accordance with prescribed equipment use standards. All items currently issued to the functional areas being modernized or replaced will be continued in use in the new facility beyond established life-expectancy dates wherever practicable. The listing of items for which replacement is requested has been determined by inspection.

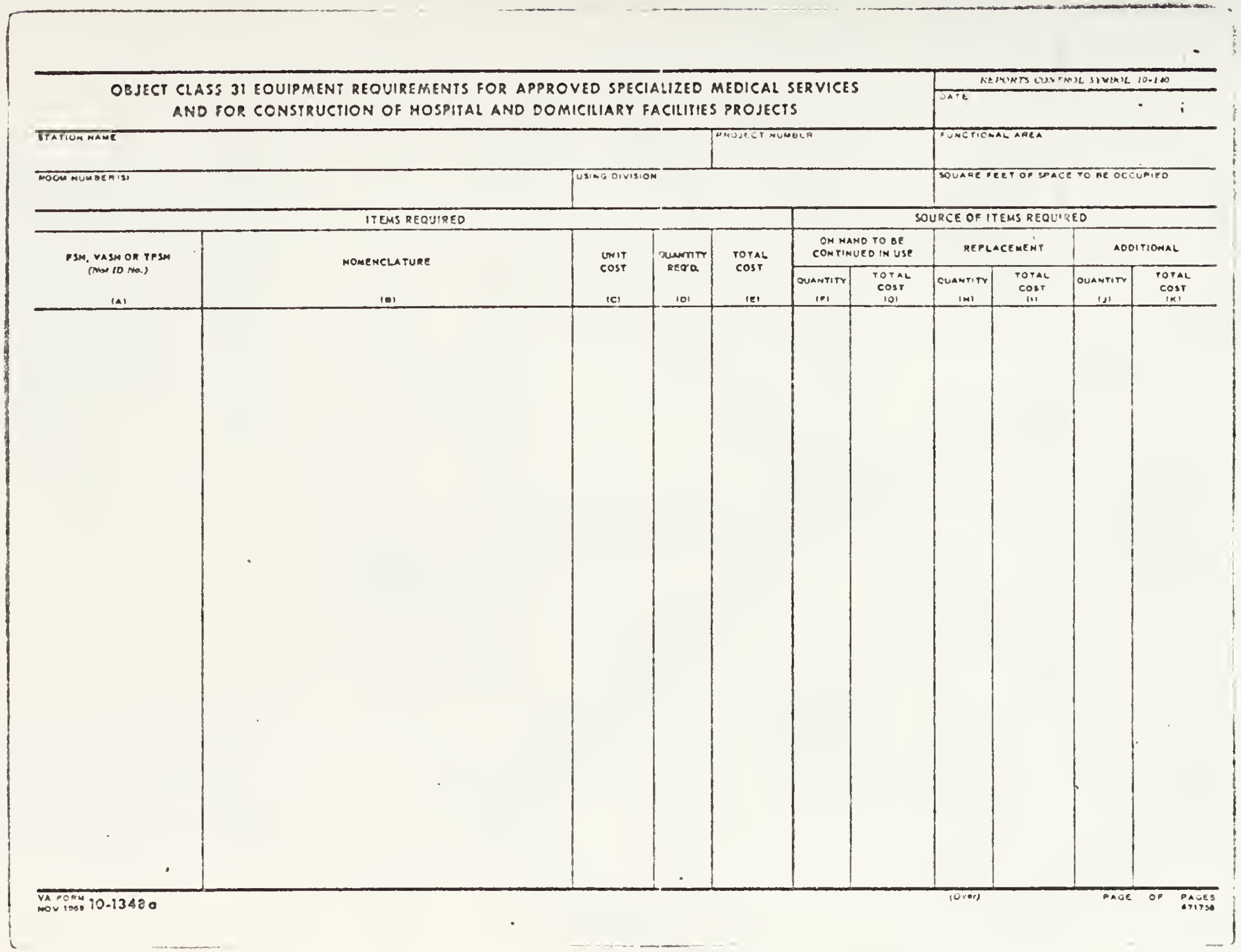
DATE SIGNED

SIGNATURE OF DIRECTOR

VA FORM
NOV 1969 10-1348

471759

APPENDIX F: VA EQUIPMENT REQUIREMENTS REQUEST



OBJECT CLASS 31 EQUIPMENT REQUIREMENTS FOR APPROVED SPECIALIZED MEDICAL SERVICES
AND FOR CONSTRUCTION OF HOSPITAL AND DOMICILIARY FACILITIES PROJECTS

REPORTS CONTROL SYMBOL 10-140

DATE

STATION NAME

PROJECT NUMBER

FUNCTIONAL AREA

ROOM NUMBER(S)

USING DIVISION

SQUARE FEET OF SPACE TO BE OCCUPIED

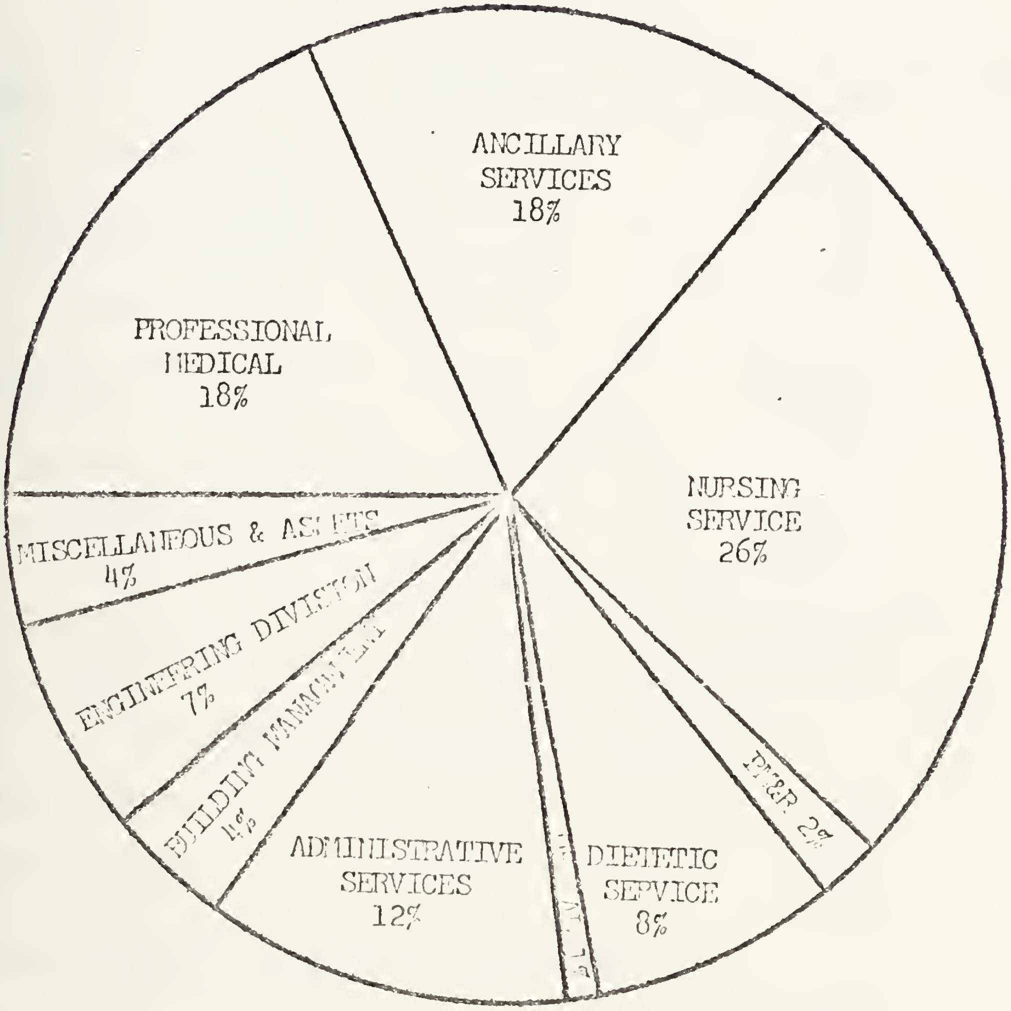
ITEMS REQUIRED					SOURCE OF ITEMS REQUIRED					
FSN, VASN OR TPSN (Not ID No.)	NOMENCLATURE	UNIT COST	QUANTITY REQ'D.	TOTAL COST	ON HAND TO BE CONTINUED IN USE		REPLACEMENT		ADDITIONAL	
					QUANTITY	TOTAL COST	QUANTITY	TOTAL COST	QUANTITY	TOTAL COST
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)

VA FORM 10-1348a
NOV 1968

(Over)

PAGE OF PAGES
471758

APPENDIX G: DISTRIBUTION OF PLANNED FY 1973 BUDGET DOLLARS



PROFESSIONAL MEDICAL	$ 2,292,230
ANCILLARY SERVICES	2,318,922
NURSING SERVICE	3,339,576
P M & R	293,404
DIETETIC SERVICE	1,051,525
DENTAL SERVICE	193,602
ADMINISTRATIVE SERVICES	1,608,090
BUILDING MANAGEMENT	492,892
ENGINEERING DIVISION	938,716
MISC. AND ASSETS	502,554
TOTAL BUDGET	$ 13,031,511

APPENDIX H: BUDGET PLAN FY 1973

ACTIVITY	PLANNED FTEE	PLANNED COST	% OF TOTAL
DIRECT CARE OF PATIENTS (Including Food Service)	594.7	$ 9,493,259	73%
ADMINISTRATIVE SUPPORT	135.5	1,608,090	12%
ENGINEERING AND BLDG. MGMT. SUPPORT	90.7	1,431,608	11%
MISC. BENEFITS AND SERVICES		176,700	1%
ASSET ACQUISITIONS		325,854	3%
TOTAL FTEE AND COST	820.9	$ 13,035,511	100%

PLANNED WORKLOAD AND STAFFING

AVERAGE DAILY PATIENT CENSUS	450
PATIENTS TREATED	7,300
AVERAGE NUMBER FULL TIME EQUIVALENT EMPLOYEES (INCL. ALL TRAINEES)	820.9
AVERAGE ANNUAL SALARY (INCL. ALL TRAINEES)	12,800
AVERAGE ANNUAL SALARY (EXCL. ALL TRAINEES)	12,511
% OF SALARY COST (EXCL. TRAINEES)	82.4

APPENDIX I: PRIORITY DEFINITIONS

PRIORITY A - *Critically needed* for direct care of beneficiaries or proper operation of the station; or, *substantial* recoverable savings will result from filling the need; or, lack of quick action will result in *considerably* greater cost in the near future.

PRIORITY B - *Essential* for direct care of beneficiaries or proper operation of the station; or, *some recoverable savings* will result from filling the need; or, lack of action will result in *some increased cost* in the near future.

PRIORITY C - *Required to improve* the care and treatment program or station operations *to meet* minimum standards; or, cost reductions of *modest value* will result.

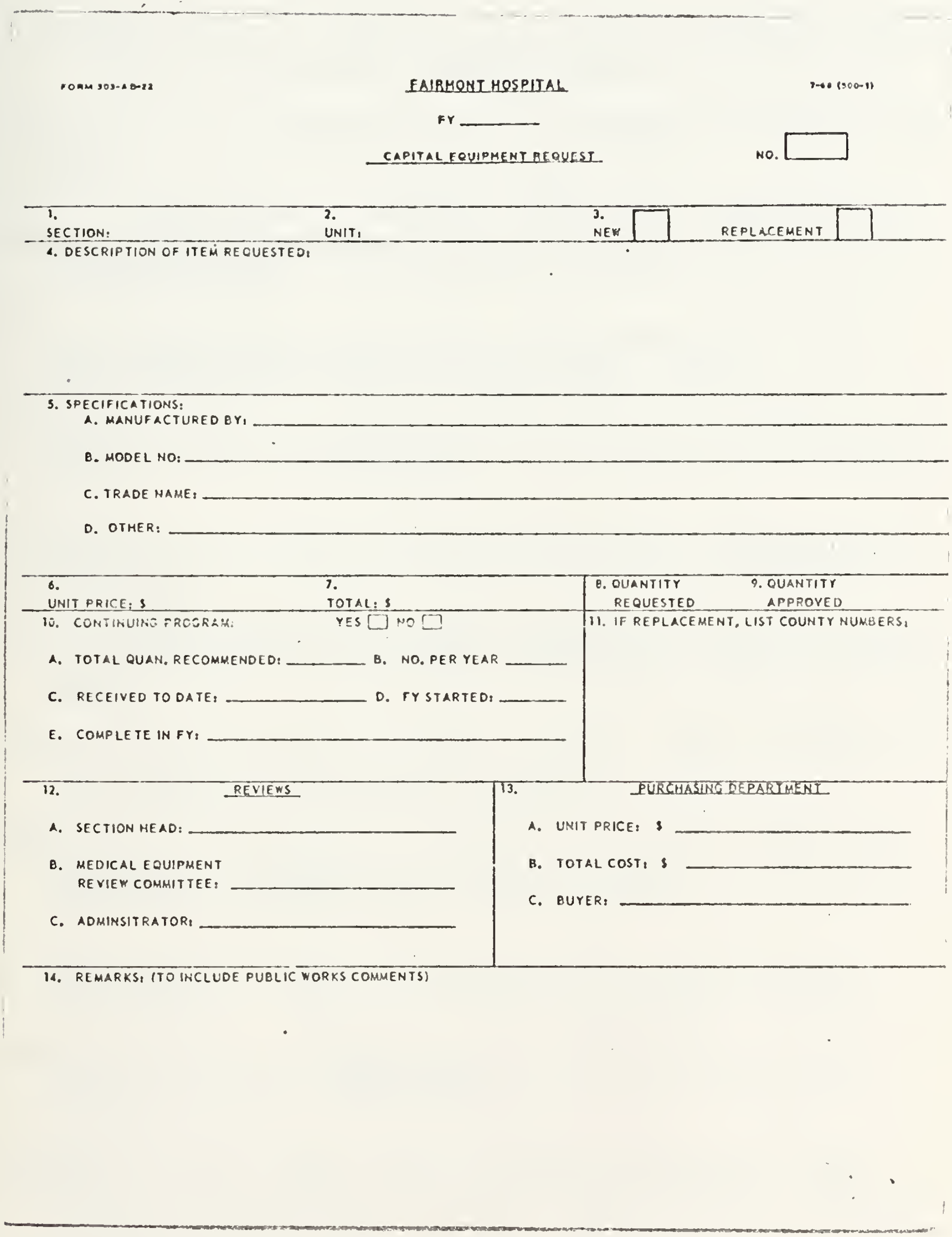
PRIORITY D - A *desirable* change or addition to increase service, care, or station operations beyond the minimum standard.

APPENDIX J: NUMBER AND RELATIVE PROPORTIONS OF NON-FEDERAL HOSPITALS IN THE UNITED STATES AS OF 1972

Hospital Type	Number	Percent of Total	Number of beds 1,000's	Percent of total beds
Long term categories:				
Psychiatric hospitals	529	7.9%	457	32.5%
Tuberculosis hospitals	72	1.1	13	0.9
General/Special	216	3.2	54	3.8
Total long-term	817	12.2%	524	37.2%
Short term categories:				
Voluntary, non-profit	3,326	50.0%	617	43.8%
Proprietary	738	11.1	57	4.1
State & local govt.	1,779	26.7	209	14.9
Total short-term	5,843	87.8%	883	62.8%
Grand Total both categories:	6,660	100.0%	1,407	100.0%

Source: American Hospital Association, Hospitals: Guide Issue, 1973, table 1, p. 7-9.

APPENDIX K: CAPITAL EQUIPMENT REQUEST



FORM 303-AD-22

FAIRMONT HOSPITAL

7-68 (500-1)

FY ________

CAPITAL EQUIPMENT REQUEST

NO. ☐

1. SECTION:
2. UNIT:
3. NEW ☐ REPLACEMENT ☐
4. DESCRIPTION OF ITEM REQUESTED:
5. SPECIFICATIONS:
   A. MANUFACTURED BY: ________
   B. MODEL NO: ________
   C. TRADE NAME: ________
   D. OTHER: ________
6. UNIT PRICE: $
7. TOTAL: $
8. QUANTITY REQUESTED
9. QUANTITY APPROVED
10. CONTINUING PROGRAM: YES ☐ NO ☐
    A. TOTAL QUAN. RECOMMENDED: ________ B. NO. PER YEAR ________
    C. RECEIVED TO DATE: ________ D. FY STARTED: ________
    E. COMPLETE IN FY: ________
11. IF REPLACEMENT, LIST COUNTY NUMBERS:
12. REVIEWS
    A. SECTION HEAD: ________
    B. MEDICAL EQUIPMENT REVIEW COMMITTEE: ________
    C. ADMINSITRATOR: ________
13. PURCHASING DEPARTMENT
    A. UNIT PRICE: $ ________
    B. TOTAL COST: $ ________
    C. BUYER: ________
14. REMARKS: (TO INCLUDE PUBLIC WORKS COMMENTS)

LIST OF REFERENCES

1. Feldstein, M. S., "Medical Economy," Scientific American v. 229, p. 151-158, September 1973.

2. Reynolds, A., "The High Cost of Health," National Review, v. 25, p. 782-4, 20 July 1973.

3. U. S. Department of Health, Education, and Welfare, Facts About the Hill-Burton Program, Public Health Service, 1969.

4. U. S. Department of Health, Education, and Welfare, Representative Construction Costs, 1970.

5. Editorial Notes, "Managing the costs of planning and Construction," Hospitals, v. 46, p. 35, 1 February 1972.

6. Goddard, J. L., "The Medical Business," Scientific American, v. 229, p. 161-167, September 1973.

7. U. S. Department of Health, Education, and Welfare, Hospital and Nursing Home Equipment Planning Guide, 1966.

8. Industrial Appraisal Company report, Cost Guidelines for Hospital Equipment Planning, 1968.

9. Muller, C. "Equipment Capital in Ten New York City Hospitals," Journal of Public Health, v. 61, p. 308-323, February 1971.

10. Uhley, H. "Automatic Monitoring for all Patients," Hospitals, v. 47, p. 101-102, 1 November 1973.

11. Harris, N. J., Bennett, L. R., "Planning a nuclear medicine unit," Hospitals, v. 47, p. 84-94, 16 October 1973.

12. Mengis, C. L., "The Age of Overutilization," The American Scholar, v. 42, p. 57-65, Winter 1972-73.

13. Rosenfeld, E. D., "Areawide planning controls costs," Hospitals, v. 46, p. 36-46, 1 February 1972.

14. Miller, M. J., "Medical device legislation," Hospitals, v. 47, p. 81-87, 1 June 1973.

15. Andrews, P. B. B., "Sales Potentials Exceed Accomplishments in the Surgical Equipment Industry," Surgical Business, p. 31-38, January 1972.

16. Hahn, J. A. L., "Hospital Financing in the 70's," Hospitals, v. 46, p. 56-58, 1 March 1972.

17. Walls, E. L., "Cost reimbursement worsens capital crisis," Hospitals, v. 46, p. 81-88, 1 March 1972.

18. Caldwell, G. B., "Financial mechanisms," Hospitals, v. 47, p. 47-50, 1 April 1973.

19. Starkweather, D. B., "Mergers and shared services," Hospitals, v. 47, p. 67-70, 1 April 1973.

20. American Hospital Association report series No. 1. Guides to Capital Financing of Hospitals, Proceedings of an Institute conducted by the American Hospital Association, Chicago, April 5-7, 1961, p. 12-13.

21. Francoeur, R. L., "Considerations for commercial loans," Hospitals, v. 46, p. 117-122, 1 March 1972.

22. Judge, D., "Leasing: a way to use equipment without buying it," Modern Hospital, v. 117, p. 123-127, October 1971.

23. Navy Bureau of Medicine and Surgery Report, v. 29, No. 4, Statistics of Navy Medicine Fiscal Year 1973.

24. Public Law 93-238, 93rd Congress, H. R. 11575, Department of Defense Appropriation Act, 2 January 1974.

25. Bureau of Medicine and Surgery directive, BUMED Instruction 4235.5D, 18 September 1972.

26. Naval Supply Systems Manual, para 22003 and 22527.

27. American Hospital Association Guide to the Health Care Field, published annually, 1973, p. 7-9.

28. Naval Regional Medical Center Oakland Report, Commanding Officers Fact Book, 1st Quarter Fiscal Year 1974.

29. Naval Regional Medical Center Oakland Report, Reconcilliation of Plant Account, 31 December 1973.

30. Veterans Administration, Budget in Brief, Fiscal Year 1974, p. 47-50.

31. United States Government Organization Manual-1970/71, Superintendent of Documents Government Printing Office, Washington, D. C., 1 July 1970, p. 531.

32. Veterans Administration Manual, MP-2, Subchapter E. Para. 108-26.9901.

33. Veterans Administration Supply Catalog, Equipment Life Expectancy and Use Standards, VA catalog No. 3, Section VIII, September 1971.

34. Veterans Administration Manual, MP-2, Subchapter E. Para. 108-25.4 "Replacement Standards."

35. Veterans Administration Hospital Martinez, Calif. Report of Medical Care Distribution Accounts, RCS 14-4.

36. Veterans Administration Hospital Martinez, Calif. Planned Hospital Budget Fiscal Year - 1973.

37. McGibony, J. R., Principles of Hospital Administration, p. 4-11, G. P. Putnam's Sons, 1969.

38. Rapoport, R., "A Candle for St. Greed's," Harpers, v. 245, p. 70-75, December 1972.

39. Medicine, "Hospitals That Heel Themselves," Newsweek, v. 81, p. 72-79, 28 May 1973.

40. American Hospital Association Report, Budgeting Procedures For Hospitals, Copyright 1971 by AHA, p. 47-54.

41. Kirby, W. H., Kluge, R. F., Dew, G. W., "Conveying Systems," Hospitals, v. 44, p. 117-121, 1 February 1970.

42. Gagnon, J. P., Rodowskas, C. A., "Capital Budgeting Techniques in the Hospital: problems and potential," American Journal of Hospital Pharmacy, v. 28, p. 686-691, September 1971.

43. U. S. Department of Health, Education, and Welfare, Public Health Service unsigned report, "Value Analysis."

44. Alameda County Health Care Services Agency report, Budget Procedure Manual 1974-75.

INITIAL DISTRIBUTION LIST

		No. Copies
1.	Defense Documentation Center Cameron Station Alexandria, Virginia 22314	2
2.	Library, Code 0212 Naval Postgraduate School Monterey, California 93940	2
3.	Department Chairman, Code 55 Department of Operations Research and Administrative Sciences Naval Postgraduate School Monterey, California 93940	1
4.	Professor L. Darbyshire, Code 55Da (thesis advisor) Department of Operations Research and Administrative Sciences Naval Postgraduate School Monterey, California 93940	3
5.	LT Bruce Edwin Talcott, MSC USN Naval Regional Medical Center Camp Pendleton, California 92055	1
6.	Chief, Comptroller Service Naval Regional Medical Center Oakland, California 94627	1
7.	Chief, Supply Division Veterans Administration Hospital 150 Muir Road Martinez, California 94553	1

JUL 19 1983

153878

Thesis
T134
c.1

Talcott

Comparative analysis of capital equipment budgeting systems in health care institutions.

thesT134
Comparative analysis of capital equipmen
3 2768 002 05435 5
DUDLEY KNOX LIBRARY